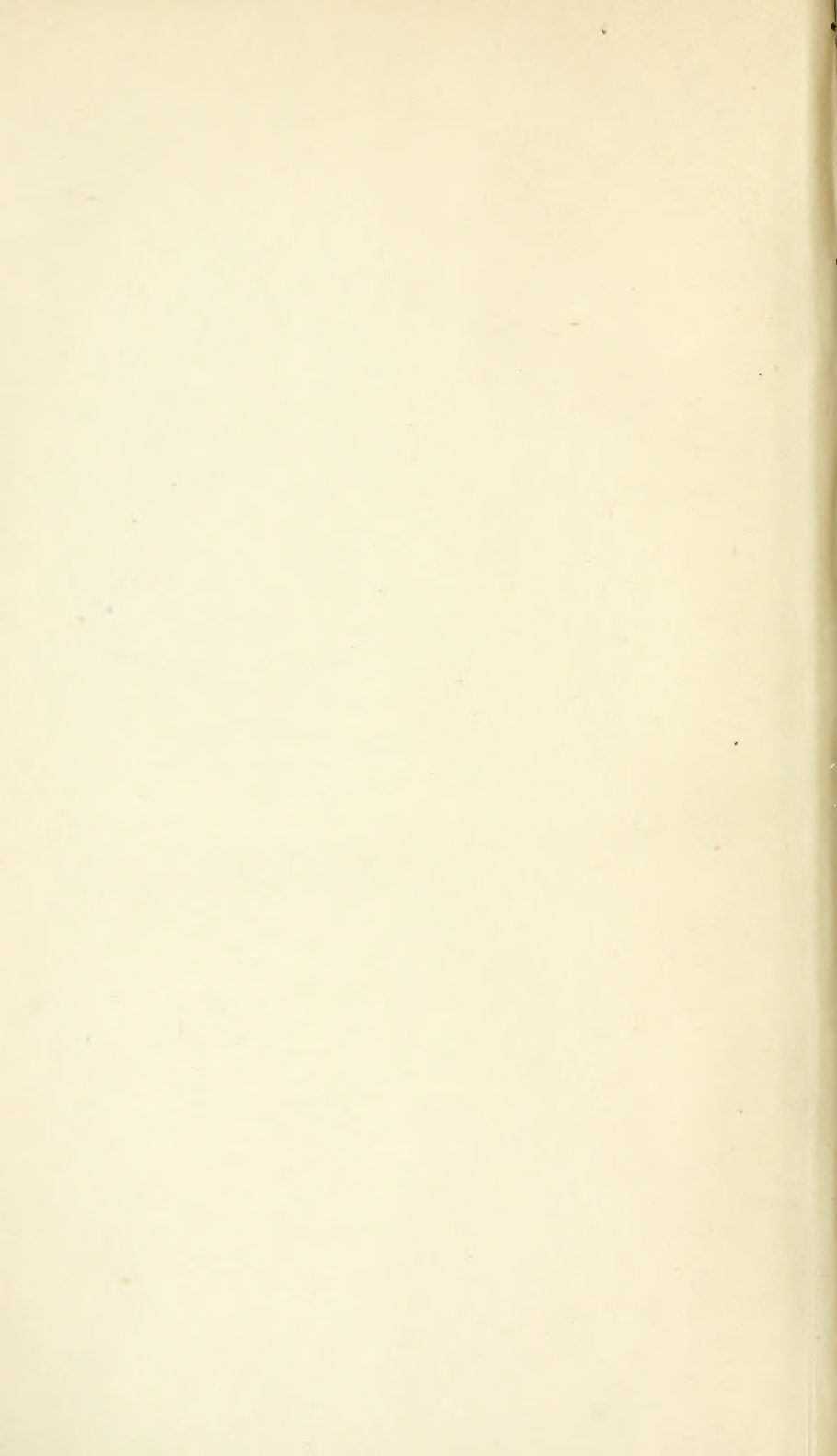


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ALBERT G. WETHERBY.

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No. 1.

NOTES ON THE DISTRIBUTION OF THE PLEURODONTÉ SINUATA GROUP

BY P. W. JARVIS.

Jamaican Pleurodontæ fall into two distinct groups: those that have two teeth on the peristome, with *P. acuta* as type (see last article), and the four-toothed species, with *P. sinuata* and *peracutissima* as types.

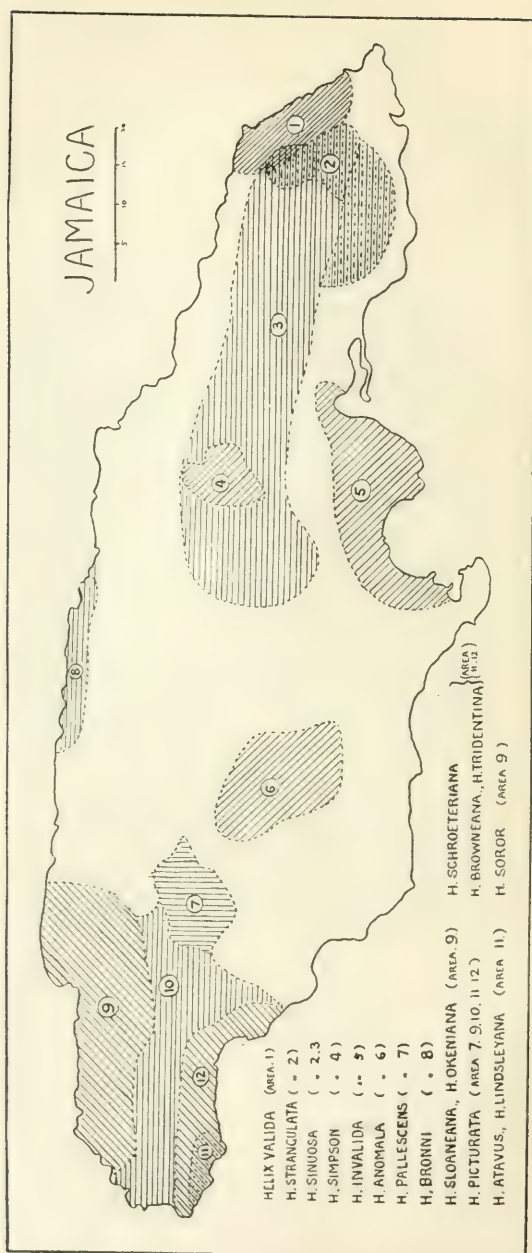
The species of this second group are:

- | | |
|----------------------------------|-------------------------------------|
| 1. <i>P. valida</i> (Ads.). | 11. <i>P. picturata</i> (Ads.). |
| 2. <i>P. strangulata</i> (Ads.). | 12. <i>P. atavus</i> (Sh.). |
| 3. <i>P. sinuosa</i> (Fer.). | 13. <i>P. lindsleyana</i> (Chitty). |
| 4. <i>P. simpson</i> (Pfr.). | 14. <i>P. schroeteriana</i> (Pfr.). |
| 5. <i>P. invalida</i> (Ads.). | 15. <i>P. tridentina</i> (Fer.). |
| 6. <i>P. anomala</i> (Pfr.). | 16. <i>P. browneana</i> (Pfr.). |
| 7. <i>P. pallescens</i> (Sh.). | 17. <i>P. sinuata</i> (Müll.). |
| 8. <i>P. bronni</i> (Pfr.). | 18. <i>P. soror</i> (Fer.). |
| 9. <i>P. sloaneana</i> (Sh.). | 19. <i>P. peracutissima</i> (Ads.). |
| 10. <i>P. okeneana</i> (Pfr.). | 20. <i>P. cara</i> (Ads.). |

Pleurodonte valida (Ads.) (No. 1 in map), John Crow Mountains, in the extreme east of the island. This common woodland species is very abundant in the north and eastern parts of this area.¹

Pleurodonte strangulata (Ads.) (Area No. 2), not a common shell, though rather widely distributed. The remarkable shape of the aperture at once distinguishes it from its allies.

¹Specimens of *P. valida* were taken near Hope Bay by C. W. Johnson and W. J. Fox, in 1891.



Pleurodonte sinuosa (Fer.) (Area No. 3). Common on the mountains in the eastern half of the island; often found from 2,000 to 3,000 feet above sea level.

Pleurodonte simpson (Pfr.) (Area No. 4). If this is not a good species, it is the small globose local form of *H. sinuata* found in the Richmond Valley district, where it abounds to the exclusion of the other forms of *sinuata*.

Pleurodonte invalida (Ads.) (Area No. 5) is limited to the lowlands of St. Catherine and common all over this district, even in the wooded swamps near the sea. It is found in company with the var. *sublucerna* of *acuta*, and possibly is a diminutive or lowland variety of *H. sinuata*.

Pleurodonte anomala (Pfr.) (Area No. 6) is a very remarkable and readily distinguished species, limited to the Manchester district. The var. *convexa* of Adams occurs at Balacava.

Pleurodonte pallescens (Sh.) (Area 7) is limited to the cock-pit country, and very common in the "sink-holes" at Mulgrave, in St. Elizabeth.

Pleurodonte bronni (Pfr.) (Area 8) is not a common shell, being limited to a few miles of the coast hills on the north side of the island, near Rio Bueno and St. Ann's Bay.

Pleurodonte sloaneana (Sh.) and *P. okeniana* (Pfr.) (Area 9) are both distributed throughout this area. *P. sloaneana* is very common and found living everywhere, whilst *P. okeniana* (the larger of the two species) is represented by dead shells alone in the southern and eastern parts of this area, and at present only found living at Hanover.

Pleurodonte picturata (Ads.) (Areas 7, 9, 10, 11, 12). This extremely pretty shell spreads from the cock-pit country through St. James, Hanover, Westmoreland and the western parts of St. Elizabeth. The var. A. of Adams with the more elevated spire and closed umbilicus, occurs in the western parts of Westmoreland and common near Negril.

Pleurodonte atavus (Sh.) (Area 11) is very local, limited to low coast hills lying west of Little London in Westmoreland, where it is far from abundant. The arrangement of the teeth on the peristome and general build of the shell at once distinguish it.

Pleurodonte lindsleyana (Chitty) (Area 11). A few poor specimens of this shell come from the same locality as *P. atavus*. This

is also Chitty's type locality where he obtained a few good specimens.

Pleurodonte schroeteriana (Pfr.) (Area 12). This species abounds in the wood of the western part of Westmoreland, it occurs much less commonly in the other parts of this area.

Pleurodonte tridentina (Fer.) and *P. browneana* (Area 12) are found in the woods on the northern parts of this area, at a higher elevation than *P. schroeteriana*. These two species are allied to *P. schroeteriana*, and if not good species, the types are very highly differentiated varieties. These shells are also subject to considerable individual variation.

Pleurodonte sinuata (Müll.) is the only species of this group which is found almost all over the island. Slightly specialized local forms do occur, but it is remarkable that a shell so widely distributed and so abundant should be so constant.

Pleurodonte soror (Fer.) (Area 9). This shell occurs in the Parish of Hanover and the bordering mountains of Westmoreland.

Pleurodonte peracutissima (Ads.). This shell is generally distributed over the higher regions of Manchester, Clarendon, St. Ann, Trelawny and St. Elizabeth. In spite of this species being so widely distributed and varying very much in size, and other minor characters, there is little doubt as to the extreme varieties belonging to the same species. Several localities have their typical varieties of this species.

Pleurodonte cara (Ads.) inhabits the western part of the Island (the part shaded on the map), and a few stragglers have been found in the mountains on the north of Manchester and St. Elizabeth. There are two very distinct varieties of this shell, the type with the "very thick, strong lip" from St. James and Hanover, and the common and more widely distributed variety which is of a much lighter build and with thinner lip.

NOTICES OF NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY.

Eulota despecta var. *kikaiensis* n. var.

Smaller and more solid than *despecta*, pink-tinted, at least near the aperture; the cuticle thin or wanting, hardly yellowish. Inner

border of the lip more or less thickened, pink or lilac colored, the throat paler. Whorls 5 to $5\frac{1}{3}$.

Alt. 17, diam. 19 mm.

Alt. 15 to $15\frac{1}{2}$, diam. 17 mm.

Kikaiga-shima, Oshima group, Osumi.

The fossil specimens from Kikaiga-shima belong to the larger typical form, which also still exists in the living fauna of the island, practically indistinguishable from the Okinawa shells, and showing the same color variations, from brownish-pink to a whitish straw tint.

Punctum morseanum n. sp.

Shell umbilicate, depressed, convex, low conic above, convex beneath, thin, brownish-corneous. Surface slightly shining, nearly smooth, but there are a few irregular and low thread-like striae of growth. Whorls $3\frac{1}{2}$, convex, separated by a well-impressed suture, the last whorl rounded at the periphery, convex beneath. Aperture oblique, rounded, somewhat less than one-fourth of the circle excised at the parietal wall. Peristome simple and thin, the columellar margin dilated. Width of the umbilicus one-sixth the diameter of the shell. Alt. 0.73, diam. 1.9 mm.

Hirado, Hizen, in western Kyūshū. Types no. 83024 A. N. S. P., from no. 5536 of Mr. Hirase's collection.

This species is much larger than *P. japonicum* Pils. It differs from *P. amblygona* (Reinh.) and its variety *pretiosum* (Gude) in the rounded periphery and smoother surface. *P. leptum* (Westerl.), described from Nagasaki, which is not known to me by specimens, is apparently different in its sculpture of delicate, crowded, cuticular lamellæ, and in the obtuse angulation of the last whorl.

Prof. E. S. Morse informs me that he has demonstrated the existence of the genus *Punctum* in Japan by examination of the jaw. The species he worked on has not been determined, but it may not unlikely prove to be *amblygona* Reinh., as that occurs in the region of Tokyo. The described Japanese species mentioned above I have referred to *Punctum* from their shell-characters only. All of them are extremely small.

Hirasea acuta n. sp. Shell solid, biconvex, acutely carinate at the periphery, densely and finely striate above, and decussated with fine spirals below; brown, paler or whitish around the perforation; whorls slightly over 4, flat, the last deflexed in front, contracted at

the mouth. Aperture small, acutely angular at the position of the keel; basal lip strengthened within by a strong, white, callous rib. Alt. $1\frac{1}{2}$, diam. $3\frac{1}{2}$ mm.

Imotoshima, Ogasawara (Mr. Y. Hirase).

Not quite so depressed as the slightly larger *H. acutissima*, and beautifully decussated beneath.

Mandarina mandarina var. *comus* n. var. Shell much elevated, the spire pyramidal, with obtuse apex. Nearly black brown, 2 or 3 early whorls reddish; sometimes with a pale patch at the middle of the base. Alt. 21, diam. 22 mm.

Imotoshima, Ogasawara (Mr. Hirase, no. 896).

Clausilia japonica var. *okinoshimana*, n. var. Larger than *japonica*, coarsely fold-striate, with fine spiral striae visible in most of the interstices; whorls $11\frac{1}{2}$. Dark purplish-brown, with a yellowish border under the sutures on the middle whorls. Aperture, lamellæ and plicæ as in *C. japonica*. Length 31–34, diam. 7–8 mm.

Okinoshima, Tosa. Types no. 80846 coll. A. N. S. P., from no. 585 of Mr. Hirase's collection.

Distinguished by its large size, dark color and strongly developed sculpture. It is not, however, different from *japonica* in any important structural feature.

Microcystina yakuensis n. sp.

Shell imperforate, depressed, biconvex, thin, somewhat translucent, pale yellow, glossy and smooth. Spire low conoidal, composed of $4\frac{1}{2}$ convex, slowly increasing whorls separated by a well impressed suture. Last whorl rounded peripherally, convex beneath, impressed at the axis. Aperture lunate; peristome thin and fragile; columellar margin reflexed, somewhat thickened. Alt. 1.2, diam. 2.3 mm.

Yaku-shima. Types no. 83035, A. N. S. P., from no. 900 of Mr. Hirase's collection.

This species is a miniature of "*Macrochlamys*" *tanegashimæ*, of Tanega-shima and Satsuma.

Kaliella Okiana n. sp.

Shell subperforate, conic-depressed, thin, brownish, somewhat glossy, the upper surface slightly striatulate, base whorl glossy. Spirally striate. Spire conic, composed of 5 convex whorls, the last slightly angular in front, becoming rounded. Aperture lunate,

the lip single and thin, columellar margin suddenly dilated and reflexed at the axial insertion, a little thickened. Alt. 2.1, diam. 2.7 mm.

Hirado, Hizen. Types no. 82969 A. N. S. P., from no. 891 of Mr. Hirase's collection. Named for Mr. Oki, Mr. Hirase's correspondent in Hirado.

Kaliella hizenensis n. sp.

Shell minute, imperforate, depressed-conic, thin, yellowish, somewhat transparent. Surface sculptured with excessively minute, densely crowded radial striae above, nearly smooth beneath. Spire low-conic, composed of slightly more than 4 very convex, slowly increasing whorls, the last rounded at the periphery, convex beneath, impressed at the axis. Aperture oblique, rounded-lunate, the peristome thin and simple, dilated and reflexed at the columellar insertion. Alt. 1.4, diam. 1.9 mm.

Hirado, Hizen. Types no. 82970. A. N. S. P., from no. 892 of Mr. Hirase's collection.

This very small species, of which 10 specimens were sent, is somewhat like *K. pagoduloides*, but more depressed and not so large.

DESCRIPTION OF A NEW UNIO FROM TENNESSEE.

BY WM. A. MARSH, ALEDO, MERCER CO., ILLINOIS.

Quadrula Beauchampii n. sp. Pl. I, lower two figs.

Shell subtriangular, inflated over the umbones and beaks; shell very thick and solid, thicker before, beaks solid, raised and *incurved*, inequilateral, rounded before, obtusely angular behind, ligament short, thick, light brown, epidermis yellowish-brown, growth lines close and very prominent, almost sulcate. Shell compressed at the base, slightly flattened on the sides, umbonial slope rounded, posterior slope rather wide, with a dark impressed line from beaks to basal margin. Beak sculpture unknown. Cardinal teeth heavy and solid, rather compressed, corrugate and sulcate, lateral teeth short, thick and slightly curved. Anterior cicatrices small and deep, posterior cicatrices distinct and well impressed, shell cavity wide, cavity of beaks deep and obtusely angular, nacre white. Dimensions of an adult specimen: diam. 1.4, length 2.2, breadth 2.3 inches.

Hab.: Little Tennessee River, Tenn., Wm. U. Beauchamp, and Holston River, Tenn., Mrs. Geo. Andrews.

Remarks: I obtained three specimens from Wm. U. Beauchamp a number of years ago; afterwards Mrs. Geo. Andrews sent me several of them from Holston river, Tennessee.

They are near *globatus* Lea, but were too different to place with that species. In outline they are subtriangular, not spherical, and rounded like that species. They are more solid and heavy, and a larger species than *globatus*. They have a lighter colored epidermis, with closer growth lines, and the surface of the shell is rougher.

They need not be confounded with my *Andrewsii*, as they differ in outline, teeth and character of the rays, and are a very much larger species, and more solid and heavy.

They vary greatly in character of the rays; some are rayless, two have obscure maculations, while some have very obscure, indistinct rays. I name this shell after Wm. U. Beauchamp, who first sent me these shells, and who formerly was greatly interested in this family of shells.

Quadrula Andrewsæ Marsh. Pl. I, upper two figs. NAUTILUS XV, p. 115.

PHOLAS TRUNCATA IN SALEM HARBOR.

BY EDWARD S. MORSE.

Pholas truncata, first described by Say in the Journal of the Academy of Natural Sciences, in 1822, with distribution indicated as southern, has been reported by others in Connecticut, Vineyard Sound and New Bedford Harbor. It has never to my knowledge been found north of Cape Cod. Lately Mr. J. J. Connor, connected with the Peabody Academy of Science, in digging for *Pholas crispata*, in Salem Harbor, Mass., found large numbers of another species, which proved to be *P. truncata*. They were found at extreme low-water mark in very hard, fine clay, in company with very small specimens of *P. crispata* and large specimens of *Petricola pholadiformis*. Many young of *P. truncata* were also found. The burrows of this species were very large, in some cases exceeding an inch in diameter. Prof. Verrill states that in Vineyard Sound they are found at all elevations between tides. In Salem harbor they appear only at low tide.

A NEW RISSOINA FROM CALIFORNIA.

BY PAUL BARTSCH.

Rissoina bakeri spec. nov.

Shell small, sub-diaphanous to milky white. Nuclear whorls two, quite large, with beveled shoulder, smooth. Later whorls well rounded, somewhat angulated about one-fourth below the summit, ornamented by about twelve to fourteen quite well developed axial ribs and a series of prominent axial striations, between them in the intercostal spaces, which are about four times as wide as the ribs; both ribs and striations extend from the summit of the whorls to the umbilical region, which is bordered by a basal fasciole. Sutures simple, well marked. Aperture large, very oblique, sub-oval, slightly notched at the posterior angle. Outer lip varicose.

The type, No. 130562, U. S. Natl. Museum collection, is from San Pedro, California. It has seven whorls (nucleus included), which measure: Long, 2.7 mm.; diam., 1.0 mm.

Other specimens examined were collected at White's Point and Pacific Beach, Cal., and San Martin Island, Lower Cal. One of these has as many as sixteen axial ribs. On some specimens these are quite prominent, while in a few individuals they are but feebly expressed.

This species is nearest related to *R. newcombei* Dall, differing from it in having the whorls more inflated, slightly angulated with much less conspicuous axial intercostal sculpture, and in having the base rather prolonged and provided with a much stronger fasciole.

The species is named after Dr. Fred. Baker, of San Diego, California, whose collecting at San Martin Island has largely increased the number of species known from that locality.

GENERAL NOTES.

At the March meeting of the Section on Conchology of the Brooklyn Institute of Arts and Sciences, two topics were discussed; *The Preparation and Care of Cabinet Specimens* and the genus *Nassa*. Under the first topic several very practical suggestions were made by Prof. R. Ellsworth Call, President of the Section, based upon his long experience in that work. The discussion of *Nassa* was illustrated by many specimens from the rich collection of Mr.

Charles A. Dayton, and also by the specimens in the Children's Museum, in which building the meetings are held.—FRANK H. AMES, *Secretary*.

ALBERT G. WETHERBY.¹

Professor Albert G. Wetherby was born in Pittsburg, Pa., in 1833. While yet a boy his parents removed to the vicinity of Cleveland. Here he obtained a rudimentary education, and afterwards went to college. After his graduation his time for several years was spent in farming in the summer and teaching a country school in winter. In 1861 he removed to Cincinnati, where he was appointed principal of the Woodburn public school. He filled this position with great acceptability during nine years; but his friends, recognizing his broad scholarship and his special fitness to teach the natural sciences, urged his appointment to a professorship in the Cincinnati University, and in 1870 he was elected to the chair of natural history. But as the University was new, and spending its money in new buildings and equipment, the chairs of geology and botany were added to his duties. Professor Wetherby was young, full of energy and enthusiasm, and during these six years of his university work accomplished more than mortal man should have attempted. But even if he had nerves of steel, he saw that he would soon break down under this overwork, and so he resigned to accept a more lucrative position in the business world.

Professor Wetherby was a born teacher, and some of his friends thought he made the mistake of his life in resigning his chair in the University to accept a business position. But the trustees had placed upon him burdens too heavy for one man to bear, and he was too conscientious a teacher to slight his work.

His enthusiasm for his favorite studies was contagious. No one could be in his society long without feeling the wonderful magnetic power of this man. On one of his excursions with his class in geology he penetrated the wild mountain region of South Carolina. Little did he then think that this region would be his future home; that he would spend his last years among these strange people, the

¹ The portrait is reproduced from the last photograph which he had taken and represents Prof. Wetherby at about fifty years of age.—EDITORS.

followers of Cromwell, who sought to hide from the wrath of Charles II. in these mountain fastnesses.

He resigned his position in the Cincinnati University to become the general manager of the American and European Investment Company, which position he held for two years.

In 1886 he was made manager of a large tract of timber and mineral lands belonging to the Roan Mt. Steel and Iron Co. This appointment compelled him to remove with his family to North Carolina. Here his home was located in one of the most beautiful valleys in the world, about 3000 feet above the sea level and surrounded with towering mountains. To one who was such a lover of nature this was an ideal place. Here surrounded by his interesting family he varied his other duties, which were many, by communion with nature.

His hospitality was unbounded, and his home was always open to friend or stranger and especially to any strolling naturalist, who was always sure of a hearty welcome from the professor and his estimable wife.

Professor Wetherby, while connected with the Cincinnati University, organized five expeditions for field work and study, in all of which the writer had the pleasure of being one of the party. As an organizer of a camping party he had no superior. He was a very companionable man, could tell a story, sing a song or play on his violin to drive away the blues, when the weather was unpropitious, and could cook a meal under the most unfavorable circumstances that would satisfy the most fastidious epicure.

The naturalist's best hunting grounds are generally far from the lines of civilization. No mountain roads, however impassable, or swollen streams, could turn him from his course. Difficulties which would appall ordinary men only seemed to stimulate his indomitable will power, which always carried him safely through.

Among his numerous friends in Cincinnati, perhaps none mourned his death more than those who shared with him the joys and hardships of camp life.

Professor Wetherby was taken sick Jan. 1st, with congestion of the lungs, at his home in Magnetic City, N. C. He seemed to slowly improve, when on Feb. 10 he was taken with sinking spells due to heart failure. He died Feb. 15, and was buried at Magnetic City, N. C., Feb. 18, 1902.

The following papers by Prof. Wetherby appeared in the Journal of Cincinnati Natural History Society, Vols. II to VI, and Vols. XVI and XVII: Descriptions of new fossils from the Cincinnati group; also from the Subcarboniferous. Descriptions of new species of crinoids from the Kaskaskia Group; also from the Subcarboniferous. Remarks on the genus *Pterocrinus*. Some notes on American land shells. Trenton rocks at High Bridge, Kentucky. Remarks on the Trenton limestone of Kentucky, with descriptions of new fossils. Geographical distribution of some fresh-water mollusks of North America. Descriptions of Crinoids from the subcarboniferous of Pulaski county Kentucky. Descriptions of new fossils from Lower Silurian and Subcarboniferous of Ohio and Kentucky. Notes on Trenton fossils of Mercer Co., Ky. Descriptions of new fossils from the Lower Silurian and Subcarboniferous rocks of Kentucky. Directions for collecting and preparing land and fresh-water shells. Relation of mollusks to shells. Natural history notes from North Carolina.

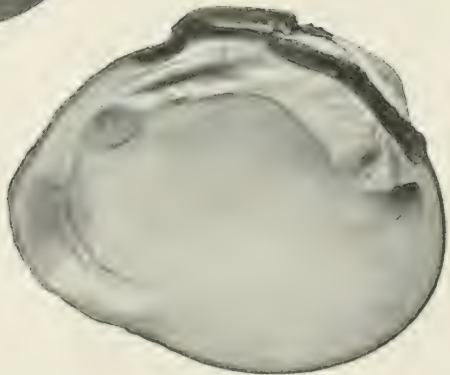
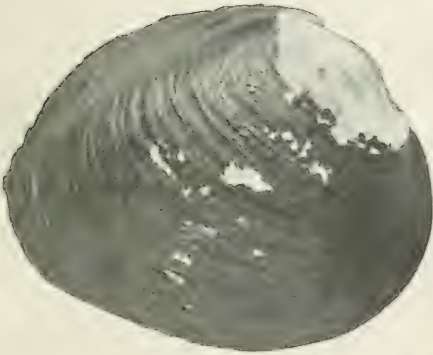
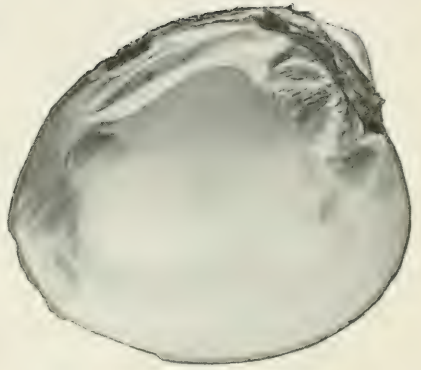
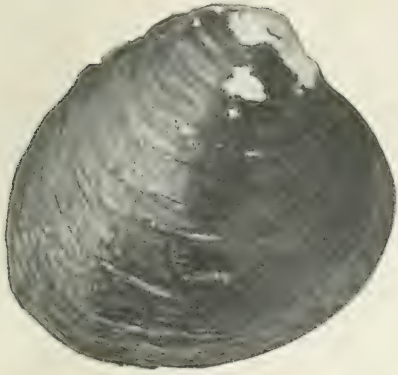
Journal of Science, Vol. I. Description of Lepidopterous Larvæ.

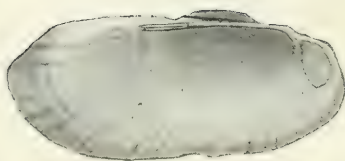
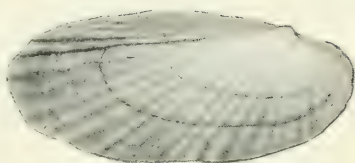
The following articles were published in the NAUTILUS, Vols. VIII and IX: A few notes on *Helix appressa*. A few notes on *Helix tridentata*. New records of Reversed American Helices. Remarks on the Variation in Form of the Family Strepomatidæ, with descriptions of New Species; read before the Cincinnati Natural Historical Society, December 7, 1875.

Quarterly Journal of Conchology, No. 11, May, 1877. "Review of the Genus *Tulotoma*, with remarks on the geographical distribution of the North American Viviparidæ."

The above list of papers published by Professor Wetherby, though not complete, gives some idea of the versatility of his mind and his great capacity for work. His last years were spent in a careful study of the mosses and grasses of the Roan Mt. region, which work, had he lived to complete it, would have been a valuable contribution to the botany of North Carolina. He made a fine collection of the smaller mammals peculiar to the Roan Mt. region, which he presented to the Smithsonian Institution. His large and valuable collection of minerals he presented to the Cincinnati University. His collections of plants, of fossils, of land and fresh-water shells, are very valuable, as they contain many unique specimens and all the types of the species described by him.

GEO. W. HARPER.





DANIELS: LAMPSILIS BLATCHLEYI.

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No. 2.

A NEW SPECIES OF LAMPSILIS.

BY L. E. DANIELS.

Lampsilis blatchleyi n. sp. Plate II.

Shell long, elliptical or obovate, compressed, thin, inequilateral, slightly gaping behind; beaks low, but little inflated, pointed, with minute nodulous sculpture; dorsal and basal outlines lightly curved; anterior end somewhat narrowed, rounded; posterior end rounded and lightly and obliquely subtruncate above; surface with singular growth lines; epidermis somewhat concentrically wrinkled, projecting beyond the border of the shell, yellow green with faint green rays; pseudocardinals rudimentary, smooth, subcompressed; laterals straight, single in the right valve, partly double in the left; nacre brilliant, iridescent, having a somewhat coppery luster in the cavities, becoming very thin and greenish at the edges.

Length 45, height 21, diameter 10 mm.

Length 40, height 17, diameter $8\frac{1}{2}$ mm.

Soft parts: Marsupium very large, occupying the posterior two-thirds of the outer gills, each lobe containing apparently about forty narrow ovisacs, the whole rounded and projecting well below the inner gills; inner gills united to the abdominal sac throughout their length; palpi large, elliptical, projecting backward but little; mantle much thickened on the border, its edges being decidedly double wavy and dark-colored; branchial opening rather large, with stout papillæ; anal opening small, crenulate; super-anal opening long, closed below; foot rather large.

Habitat: Wabash River, Section 32, Linn Township, Posey

County, Indiana. Found only on gravel bars in swiftly running water.

Fourteen specimens were collected by the author in August, 1901, while working for the Indiana State Geological Survey.

The smaller of the two type specimens (figured a little enlarged on pl. II) is in the Indiana State Museum, the other in the author's cabinet. Soft parts in the U. S. National Museum.

I am under obligations to Mr. C. T. Simpson for assistance in preparing the description of the soft parts.

The species is closely allied to *L. leptodon* Raf., particularly in its anatomical characteristics; the shell differs from that species by not having the wing and by the posterior end being rounded and in the full-grown shell being not more than one-half the size.

The two small shells found at Hardy, Ark., by Mr. J. H. Ferriss, by him referred to *L. simpsoni* (NAUTILUS, Aug., 1900, page 39), are without doubt this species.

Mr. C. T. Simpson informs me that Mr. Paul Bartsch of the National Museum believes he has found the same species in the Iowa River at Iowa City, Iowa.

I take pleasure in naming this species in honor of Prof. W. S. Blatchley, State Geologist of Indiana.

NEW ENGLAND MARINE COLLECTING.

BY REV. HENRY W. WINKLEY.

Occasional letters ask the following questions: "Can I stock up duplicates by a week or two in New England? Where is the best place to collect?" An answer to all may be made by narrating my own experience. During fifteen years I have devoted much time to collecting. Considerable dredging has been done, but not below 25 fathoms. The most careful searching has been done at Eastport, Wiscasset, Casco Bay and Old Orchard, Maine, and Wood's Holl, Mass. Other places have had some visits. This area contains perhaps 250 shell-bearing mollusca; of these I have 200 and lack 50. Of the 200 found by me, 113 species I have only for my own cabinet, 12 more I have spared for exchange perhaps once, and 20 more have yielded a few exchanges. This leaves 55 species that I have had in quantity.

Let me add notes on the fifty-five: *Litorina*, *Nassa*, *Ilyanassa*, *Mytilus*, *Mya*, *Tottenia*, and a few others are general in distribution. Many others are limited, as follows: *Ostrea*, *Venus*, *Urosalpinx*, *Bittium*, *Sycotypus*, etc., common south of Cape Cod, but rare or wanting to the north. Again, *Buccinum*, *Lunatia*, *Cyprina*, and others should be sought in Maine. Many shells are found abundantly in limited portions of the coast. *Acmaea testudinalis*, common at Eastport, is scarce even in other parts of Maine. *Chiton albus* and *marmoreus*, with *Margarita groenlandica*, must be gathered at extreme tides in the Bay of Fundy. To be sure they occur elsewhere, but they are small and not abundant. The harvest season for *Lunatia* and *Cyprina* is after certain storms at Old Orchard. Sometimes these occur once or twice in a winter, or a year or more may pass without the harvest, but when they roll in they are very abundant. Dredging has an element of luck. One haul in the Penobscot Bay gave *Nucula proxima* enough for some years of exchanging. *Pecten magellanicus* is abundant in small areas, but it is easy to miss the spot. Another fact is the best region. *Buccinum* is common at Eastport, but small. The finest specimens are from Casco Bay. Yet other things, like Limpets and Chitons are at their best in Fundy waters.

The New England shells are very much in demand, but the lack of stock compels one to send frequent regrets. There is an amusing side to the work. One well-disposed friend asked for a dozen *Pecten islandicus*; I never saw a dozen. Prof. Verrill tells me that the government dredgings only yielded three or four in a summer.

It must be understood by the readers of this article that I speak of my own experience. Some forms that have not been found abundantly by me may be found in quantities at times, yet I think one may form an estimate of the difficulties we meet in New England.

NOTES ON THE GIANT LIMAS.

BY WILLIAM HEALEY DALL.

The reception of a specimen of *Lima goliath* Sowerby (1883) the other day led to comparisons of and annotations on the great deep-water species. The dean of this assembly is the well-known *Lima*

excavata Fabricius (1779) from Norway (150–300 fms.). Next comes *L. goliath* from Japan (775 fms.), which reaches about the same size as *excavata*. A third form is recorded from the West coast of Patagonia (245–481 fms.), which I shall call *L. patagonica*, and a fourth *L. agassizii* n. sp., from the Gulf of Panama in 322 fathoms. A section, *Acesta*, has been proposed to include these species by H. and A. Adams.

All of them have fine microscopic radial striae and coarser radial sculpture, which is more pronounced toward the ends of the shell. In all there is a concentric grooving in the channels between the ribs, which, when the channels are narrow, takes on the appearance of punctation. All have a very narrow gape for the byssus and a flattened or impressed lunular area. All have a very general similarity externally. The Patagonian species has an astonishing likeness to *L. excavata*. It may be useful to record the distinctive characters.

L. excavata. Convex; the whole disk radially grooved, the grooving feebler mesially; the most impressed part of the lunule close to the hinge line, the shell moderately arcuate, the posterior outline roundly convex; color grayish white; resilium broad, somewhat oblique. Alt. 140; lat. 106; diam. 55 mm.

L. goliath. Flatter, broader, the middle of the disk smooth, posterior radials fine and close-set; most impressed part of the lunule lower down, the lunule itself longer, the shell more arcuate; color milk white, sometimes with a yellow flush inside, hinge line longer and resilium slightly more central. Alt. 140; lat. 106; diam. 36 mm.

L. patagonica. Narrower and less convex, the whole shell straighter vertically, the lunule narrower and less impressed, a slight tendency to divarication in the obsolete radials of the middle of the disk, otherwise like *L. excavata*. Alt. 100; lat. 72; diam. 31 mm.

L. agassizii. Moderately convex; the radial grooving quite uniformly distributed distally, feebler mesially near the beaks, the interspaces smoothly convex, and not sharp and corrugated anteriorly; lunule short, deep and narrow, anterior end of the hinge-line very short; area of the hinge narrow, and the resilium and pit very narrow and oblique; color chalky white, with a yellow periostracum. Alt. 97; lat. 78; diam. 30 mm.

L. goliath and *L. patagonica* show distinctly obsolete lateral teeth

near the angles of the hinge-line, but in *L. excavata* there is no trace of them, and the hinge of *L. agassizii* is too chalky to be certain about their presence or absence. They are most distinct and prominent in the young shell. *L. agassizii* was dredged by the U. S. Fish Commission steamer *Albatross*, as were our specimens of *L. patagonica*.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY H. F. CARPENTER.

The following species are additional to those hitherto described in this series, and complete the list of known species from Rhode Island:

214. *Lucina filosa* Stimpson.

Lucina radula Gould, Inv. Mass., 1st ed., p. 69, 1840; Mighels, Bost. Jour. Nat. Hist., iv, 318.

Lucina contracta De Kay, Nat. Hist. N. Y., 1843.

Lucina filosa Stimp., Shells of New Eng., 17, 1851.

Shell white, thick, orbicular, moderately convex; hinge margin straight; beaks small, pointed, projected over a small, indented, smooth, lanceolate lunule. Exterior covered with remote, concentric lamellar ridges, between which are round, thread-like striae. Interior chalky-white, polished around the margins. Hinge straight, with one cardinal tooth in the left valve and two small, diverging teeth in the right valve. Length and height 2 inches; breadth, 1 inch.

This is a rare, deep water shell and was not published in the description of the "Shell-Bearing Mollusca" of R. I. because it had never been found and was not likely to be found in our waters; but several specimens were dredged in Narragansett Bay, about two years ago, by Prof. Herman C. Bumpus, then of Brown University, in Providence, to whom I am indebted for the specimens now in my collection.

215. *Physa gyrina* Say.

Shell heterostrophe, oblong; whorls 5 to 6, terminating in an acute apex; suture slightly impressed; aperture a little more than half the length of the shell; labium a little thickened on the inner

margin. This species was found in Stafford's Pond, Tiverton, R. I., by Mr. John Ford and the writer while on a trip to the southeastern part of R. I. in search of some of the rare land shells described by Mr. John H. Thompson, of New Bedford, Mass. I am sorry to state that our search for these rare shells was not rewarded by a single specimen.

216. *Sphaerium deformis* H. F. Carpenter.

Shell transversely oblong, elongated, both sides of nearly the same length; anterior margin curved; posterior margin abrupt, forming an angle with the hinge margin; basal margin having a twist to one side, as though some one had given it a pinch in the middle, squeezing it together and at the same time twisting it downwards; beaks large, inclined towards the anterior; valves thin, smooth, of a dirty brown color.

This species was found in Tiogue Reservoir, in the town of Coventry, R. I., by Mr. Richard Allen, who presented them to the writer. This species, with the somewhat doubtful *Cyprina islandica*, which (it is claimed) has been found in Rhode Island, brings up the number of species to 217, as per catalogue published by me in 1889, copies of which may be had free by addressing H. F. Carpenter, 58 Page St., Providence, R. I.

A NEW GENUS OF EOCENE EULIMIDAE.

BY THOS. L. CASEY.

As far as available literature discloses, the following genus seems to represent a new and very interesting type of Eulimidae, which may be outlined by the following characters:

Ptereulima n. gen.

Conical, devoid of sculpture, finely attenuate, with simple direct nucleus, umbilicated, the columella as usual without folds; anterior whorls having a large flattened process or wing at each side.

This genus appears to be more closely allied to the Chinese *Hoplopteron* of Fischer than any other known at present, but the latter is imperforate and has the apex obtuse.

Ptereulima elegans n. sp.—Almost evenly conical, the surface

shining, the more recent whorls perhaps a little more rapidly increasing in size than the first three or four, the apex acute with the embryonic whorls two in number and very minute, the next three small and simple, the five succeeding similar to the preceding three except in possessing, at each side, a large obtuse aliform process as shown in the figure. Umbilicus rimate. Inner lip defined throughout by callus, which is slightly reflected along the umbilicus. Surface of all the whorls feebly and evenly convex, the suture fine and simple but distinct. Length 3.5 mm.



Lower Claiborne Eocene (St. Maurice, La.)

The outer lip is broken away in the unique type, but undoubtedly possessed an aliform projection similar to that immediately above it. The processes are of the nature of thin varices which served to protect the animal, and the growth of the shell between these temporary arrests was probably very rapid.

THREE NEW SPECIES OF CHROMODORIS.

BY T. D. A. COCKERELL.

The species here described are obviously different from *C. californiensis*, Bergh, and *C. agassizii*, Bergh, and I do not find any descriptions applicable to them.

CHROMODORIS UNIVERSITATIS, n. sp. Length about 67 mm., rather narrow, mantle less ample than in *C. mefarlandi*, not expanded at the sides; rhinophores and branchiæ wholly retractile; rhinophores stout, with numerous transverse lamellæ; branchiæ of about 12 large simply pinnate plumes, several more or less branched, and so bipinnate at the ends; oral tentacles just concealed by mantle; hind end of mantle gibbous; foot projecting 20 mm. behind end of mantle; breadth of sole when crawling $8\frac{1}{2}$ mm.

Color rich dark ultramarine blue, the edge of the mantle and the edge of the foot bright cobalt blue; rhinophores very dark blue; mantle with two longitudinal series of oblong very bright orange spots, about seven in a series; five round orange spots on the anterior part of the mantle, in front of the rhinophores; under surface of posterior lobe of mantle with a series of eight round white spots, the

hindmost four large, the others smaller and rather faint; sides of foot with a series of over ten round or oval orange spots; branchiæ very dark blue, speckled with orange within; sole deep blue.

The splendid blue pigment of this animal is dissolved out after death, even in sea-water; but very fast in formalin, producing a blue liquid which is turned pink by hydrochloric acid, but is not affected by alkalies, except that strong alkalies rapidly bleach it. Curiously, the orange spots of the animal seen through the blue solution, appear red, though in reality their color is not altered.

Hab.—In rocky pools between tides, San Pedro, Calif., July 28th, and La Jolla, Cal., early in August, all collected by Wilmatte P. Cockerell. The name of the species was suggested by the fact that it carries the colors (blue and gold) of the University of California. It was also collected at San Pedro by the naturalists of the University of California Marine Laboratory.

CHROMODORIS PORTERÆ, n. sp. Length about 11 mm., form of *C. universitatis*, but uniformly much smaller, and quite different in markings. Deep ultramarine blue, including the whole of the foot; mantle with two rather broad longitudinal stripes of bright orange, not united posteriorly, and ending anteriorly at the rhinophores, but anterior to the rhinophores is a transverse orange stripe; median stripe of *C. mcfarlandi* represented by an inconspicuous lighter blue line; margins of mantle very narrowly pure white; foot wholly without marks, except that the hind end has a suffused whitish stripe. Rhinophores and branchiæ entirely retractile. Branchial plumes eleven, in a circle, simply pinnate, entirely of the blue color of the mantle. After death, a number of conical white papillæ (about 9 on each side) appear beneath the hind part of mantle. After death, the blue dissolves out, and the body becomes a sort of pale greenish-blue, with the dorsal stripe very white; and the orange bands as in life.

Hab.—In rocky pools at low tide, La Jolla, Cal., early in August, rather common. (Wilmatte Porter Cockerell.)

CHROMODORIS MCFARLANDI, n. sp. Length about 35 mm.; mantle ample, covering head, but pointed end of foot projecting far beyond mantle posteriorly; rhinophores short and stout, lamellate, with over twenty transverse lamellæ; branchiæ entirely retractile, arranged in the shape of a horseshoe, not entirely surrounding the anus, which is produced into a truncate cone; branchial plumes

twelve, simply pinnate, some of the posterior plumes bifid; oral tentacles short, wholly concealed under mantle; eyes apparently absent. Mantle brilliant purple with a yellow margin (continuous in front and behind), and three longitudinal yellow stripes; the yellow of the margin is really bright orange, bordered with white; the median yellow stripe begins a short distance before the rhinophores, and runs between them; rhinophores dark purple; foot white with a purple tint, or quite purple when contracted after death; the end of the foot is purple with a dorsal longitudinal orange stripe. The purple color does not dissolve out in formalin.

Hab.—In rocky pools at low tide, La Jolla, Cal., beginning of August; San Pedro, Cal., July 27th. All collected by Wilmatte P. Cockerell. Quite common at La Jolla. Named after Prof. F. M. McFarland of Stanford University, who has done some excellent work on the nudibranchs of Pacific Grove, Calif.

NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY HENRY A. PILSBRY.

Chloritis bracteatus n. sp.

Shell depressed-globose, almost imperforate, very thin and fragile, brown. Surface dull to the eye, under a strong lens seen to be very densely covered with very small crescentic scale-like cuticular processes, densely crowded, and arranged in nearly regular descending rows. Spire convex. Whorls $4\frac{1}{2}$, the inner slowly, the last rapidly widening; separated by a deep suture. Aperture rounded, lunate, the peristome simple and thin, at the columellar insertion abruptly dilated, almost closing the umbilicus. Alt. $13\frac{1}{2}$, diam. 18 mm.

Nishigo, Uzen. Types no. —. A. N. S. P., from no. 904 of Mr. Hirase's collection.

This most northern of all its genus is strongly distinct by its excessively minute, curved cuticular appendages, unlike the hairs of all other species of *Chloritis*.

Pupisoma japonicum n. sp.

Shell globose-turbinate, umbilicate, light brown, very delicate and fragile. Surface delicately striatulate. Spire conic, the apex obtuse. Whorls $3\frac{1}{2}$, strongly convex. Aperture very obliquely ovate,

the peristome thin, fragile, unexpanded, the columellar margin broadly dilated and reflexed. Alt. about 1.6, diam. about 1.5 mm.

Hirado, Hizen. Types no. 82974 A. N. S. P., from no. 890 of Mr. Hirase's collection.

This is, I have not much doubt, the species collected by Hilgendorf at Yedo and in Idsumo, recorded by Prof. von Martens as "eine der *H. orcula* Bens. höchst ähnliche Art;"¹ but it differs from that Bengalese species in the much larger umbilicus and smoother surface, as well as in the noticeably smaller size.

Some immature specimens from Kashima, Harima (Mr. Hirase's no. 901) are probably the same species. With the two localities given by Prof. von Martens, this gives *Pupisoma* a wide range in central and southwestern Nippon. Until mature shells can be examined, the identity of the Nippon shells with the types from western Kiushu cannot safely be assumed, although it is likely.

PUBLICATIONS RECEIVED.

Catalogue of the Binney and Bland collection of the Terrestrial Air-breathing Mollusks of the United States and Territories, in the American Museum of Natural History, with enumeration of types and figured specimens, and supplementary notes. By L. P. Gratacap (Extr. from Bull. Amer. Mus. N. H. xiv, article xxiii, pp. 335-403. Dec. 3, 1901).

The "Binney and Bland collection" was formed by Mr. Binney, consisting in part of specimens from the collection of Dr. Amos Binney. It was given by him to Thomas Bland, from whom the Museum acquired it in 1882. The collection derives its importance from containing many of the shells illustrated in *Terrestrial Mollusks* Vol. III (the plates of which were reprinted in T. M. vol. V), besides many of Mr. Binney's types. The present list, of which the scope is stated in the title, is therefore important for reference to those who have occasion to study critically the land shells of the U. S. Mr. Gratacap has added notes upon many of the species. In some cases these record varietal names found upon the original labels, but elsewhere unpublished.

Five interesting plates showing generic distribution, and the relative

¹Sitzungsberichte der Gesellschaft naturforschender Freunde in Berlin, 1877, p. 101 (Sitzung vom 17, April).

numbers of species in different parts of the areas covered by the genera have been added by Mr. Gratacap. To some extent these charts indicate, incidentally, areas in which but little collecting has been done. This is especially the case with plate xlii, representing the distribution of typical *Polygyra*.

The following names seem to be new to us:

Glandina truncata var. *minor* Binney MS. (p. 338, Cat. no. 16). Based upon "*Variety of Glandina Texasiana* Pfr.?", Terr. Moll. iv, pp. 141, 205, pl. 77, f. 21. Seems to be a very slender specimen of *G. truncata minor* Pils., NAUTILUS xiii, p. 46; Proc. A. N. S., Phila., 1899, p. 404.

Macrocyclis vancouverensis var. *semi-decussata* Binney on label (p. 340). Astoria, Oregon. This is doubtless identical with *Circinaria spartella hybrida* Anc., which we have from Astoria.

M. concava var. *minor* (p. 341). No locality or definition.

Zonites (*Gastrodonta*) *ligerus* var. *sagdinoides* Gratacap (p. 344). "A very high 'bee-hive' form from Indiana."

Zonites (*Hyalina*) *placentula* Shuttl. (p. 350), Catal. no. 294 was Binney's earlier identification of *placentula*, subsequently becoming the type of *Z. lawi*. The specimens from Monroe Co., Tenn., and St. Giles Co., Va., are true *placentula*, as afterward identified by Binney. Through the kindness of Mr. Gratacap, I have been able to examine this series.

Helix (*Patula*) *alternata* var. *costigera* Bld. MS. (p. 357).

Helix (*Patula*) *perspectiva* "var. *carinata* (p. 358) from Union Co., Tenn., is almost planate, and below the periphery the striæ approach extinction." Under *H. (P.) bryanti*, Mr. Gratacap writes, "Certainly interchangeable with var. *carinata* of *perspectiva*."

Triodopsis mullani (Bland), Cat. no. 1275 (p. 383), can hardly be that species.

Macroceramus (p. 397). The specimens recorded under *M. pontificus* as from Texas are probably *M. texanus*. That from Central America is no doubt *kieneri*, as recorded by Mr. Gratacap (see Man. Amer. Land Shells, p. 416, fig. 457).—H. A. P.

SOME UNDESCRIBED VARIETIES OF CYPRÆA.—By Mrs. Agnes Kenyon (Jour. of Conchology, Vol. X, p. 6, April, 1902).—In this paper the following varieties are described as new:

Cypræa tigris var. *lineata*. From Fiji. Differs from the type in possessing a number of longitudinal hair-like lines.

Cypræa mappa var. *viridis*. New Caledonia. Both back and base colored green or with only the dorsal surface suffused with a greenish tint.

Cypræa bregeriana var. *barbara*. New Caledonia. "Shell differing from *C. bregeriana* in the fineness of the dentition and without the violet coloring interstices, interior lined with white, not violet-purple as in *C. bregeriana*."

Cypræa helvola var. *borneensis*. Borneo. Shell smaller, with narrower sides, not incrassated or angulated, dorsal surface reddish-pink sprinkled with white, sparsely overlaid with brown spotting, base and extremities white.

Cypræa helvola var. *timorensis*. Timor Island. Differing from *C. helvola* in having white, not lilac, extremities, which are calloused, twin callosities at the posterior extremity.

Cypræa poraria var. *vibex*. New Caledonia and New Hebrides. Considerably larger than normal examples, and distinguished by a white porcellaneous band or stripe, extending from one extremity to the other, thus dividing the dorsal surface into two equal parts.

Cypræa miliaris var. *diversa*. Shark's Bay, West Australia. "Specimens very light in color, almost white, but showing spotting perfectly: they are quite distinct from *C. eburnea*, the teeth are not so coarse, the enamel of the dorsal surface is not so shining, the interior is colored pink or pale violet, while the interior of *C. eburnea* is either white or orange; specimens are comparatively small."

Cypræa carneola var. *rubicola*. Hawaiian Islands. The color of the teeth is a "bright rose-pink, in contradistinction to the purple-hued dentition of *C. carneola* or the colorless base and dentition of *C. læbbeckiana*."—C. W. J.

THE MARINE WOOD-BORERS OF AUSTRALASIA AND THEIR WORK. A paper read before the Australasian Association for the Advancement of Science. By Chas. Hedley. An exceedingly interesting paper, giving an account of their method of propagation and boring; their ravages, remedies, natural enemies and classification. The ship-worms of Australasia belong to two genera, *Uperotis* and *Nausitoria*. The genus *Teredo* is at present unknown in that region, although "*Teredo navalis*" is indiscriminately applied by engineers to all ship-worms. The paper is illustrated by four plates.—C. W. J.

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No. 3.

CRUISING AND COLLECTING OFF THE COAST OF LOWER CALIFORNIA.

BY FRED. BAKER, M. D., SAN DIEGO, CAL.

Cruising on our southern Pacific coast is less indulged in than along the Atlantic seaboard, because there is a marked dearth of the land-locked harbors into which our eastern yachtsmen can run almost every night, or in case of a threatened storm. Nevertheless, two years ago, tempted by our summer promise of continued good weather, a party of seven, including my wife and two children, started from San Diego harbor for a run down the coast of Lower California in the staunch little schooner "Lura."

A late start made it advisable to anchor over night at the mouth of the harbor, but this gave a chance to get under way at daylight for a beautiful run of seventy miles to "Todos Santos" bay, on the sloping shores of which lies "Ensenada," the capital of the northern department of the Mexican territory of "Baja California."

As we ran we left broad to the starboard the Coronados, a group of seven small islands belonging to Mexico, but lying only twenty miles off San Diego, and a common terminus of our short cruises. They, like most of the off-shore islands, are bold volcanic masses, the largest, though less than three miles long, rising 880 feet above the sea, in many places sheer for hundreds of feet. This is a type of all the coast line for several hundred miles south. Bluffs and headlands, with here and there a narrow or broad valley sweeping down to the sea, but above all and crowning all, the foot-hills and the great mountains of the Coast Range.

It was just turning dusk as we rounded Ensenada Point into Todos Santos Bay, which is little better than an open roadstead, except for the protection offered by the chain of Todos Santos islands a dozen miles to sea, and the shelter of the Point from north-west winds. Immediately on dropping anchor we were boarded by the Comandante of the port, Don Luis Fernandez, and the quarantine officer, our old friend, Dr. Peterson, who courteously waived all examination, allowing us to go ashore at will. The two nights spent here with a nearly full moon shining down on us, just enough ground swell to keep in mind that we were cruising, and the balmy breeze of semi-tropical summer blowing over us, make a memory picture as near perfection as this world gives.

The day was busy. First we had the usual difficulties with the Mexican officials. In the absence of specific instructions, they were unable to determine whether we should register our craft as a private yacht or a passenger vessel. In either case they notified us that we must bear the expense and delay of telegraphing to the City of Mexico for instructions and license. Fortunately our schooner had on a former occasion been used in fishing down the coast, and after much argument Señor Victorio decided to grant us a three months' fishing license, at the same time clearing us with a clean bill of health for the return trip to San Diego. Under this very satisfactory arrangement we could run down the coast as far as the jurisdiction of the northern department reaches—something like 300 miles—land where we chose, collect what we liked, and when we were ready, sail away home without touching again at "Ensenada."

While our sailing master was arranging all this, the rest of us passed the day in seeing the few sights of the town, observing Mexican life, and visiting a few old friends. Among these Mrs. Gastelum holds first place, not for her society alone, though she is a woman of wide experience and much knowledge, but because in a former phase of her existence she was married to a Mexican customs official, who, during his sojourn at various ports on the Pacific Coast, had collected many bushels of shells which she has stored away in many boxes and barrels. This was the second time I had overhauled the lot, and as before I was astonished at the low price placed on my pickings, after a long conference between herself and her husband—a later acquisition. As I paid the bill I reflected that while I should undoubtedly have enjoyed the society of the former husband with.

his evident love of shells, the later acquisition was probably more in harmony with the size of my pocket-book.

Away at daybreak Sunday morning, looking our last on "Ensenada," one of the goodliest sights to look upon it has been my fortune to see in a fair amount of knocking about. A great sweep of unbroken sand beach from "Ensenada Point" to "Punta Banda," a distance of eighteen miles, the high range of Punta Banda breaking off abruptly into the sea to the south, the horseshoe being completed by the low mesa-crowned Todos Santos islands. The town of Ensenada nestles on the low beach under the high ridge which forms Ensenada Point to the northwest, the broad valley reaching back with few breaks for twenty miles—then the foothills, and back of all, as always, the great mountains! It is our dry season and everything is parched and brown, and the near-by ridges show great outcroppings of black volcanic rock, but the blending of color under our brilliant California sun, and the foreshortening of great distances giving the effect of haze and softness, make a scene of marvelous beauty.

A glorious sail—free with the prevalent northwest wind—out through the narrow gate between Punta Banda and the easterly island of the Todos Santos group, which was alive with seal and waterfowl, and down a bold coast for twelve miles to cast anchor under the lee of the "Santo Tomas" headland noted all along the coast for its frequent storms. Here we divided up, one to sleep, two to fish, two to hunt deer, and two to collect shells and algae. All were successful but the deer-hunters. Unfortunately I did not keep my Santo Tomas collections apart from others, so I can give no fair idea of my catch, but a single *Haliotis rufescens*, Swainson, represents the only species not appearing in the list which closes this article.

Away again at sunrise for our final southward stretch. All day we ran almost before the wind, the coast growing generally more bold and culminating in Cape "Colnet," a great promontory presenting an almost unbroken face to the northwest, a cliff many miles long and many hundred feet high. We round the Cape with a half gale, and bear away southeasterly to our final destination, the little island of San Martin, lying five miles off the coast and ten miles from San Quintin, the first land-locked harbor in 200 miles from San Diego. We cast anchor at 3 a. m., and all hands slept late.

Of San Martin a few words' description must suffice. Roughly it is a round conical island, three miles in diameter, with two peaks, the higher a typical extinct volcano rising 471 ft., with an almost perfectly regular crater about 250 ft. in diameter, and between 75 and 100 ft. deep. The island is a solid mass of very hard volcanic rock with frequent small caves—evidently blow-holes—covered imperfectly where reasonably level by a thin soil which supports a moderately abundant vegetation in which various species of cactus are very plentiful. Up the slopes are great slides of loose rock, and owing to the cacti and the roughness of the way, the climb of a little over a mile to the top proved a very serious undertaking.

On the north side of the island a moderately level space, covering between 500 and 1,000 acres, is occupied by rookeries, mostly of pelicans and cormorants. The birds were most of them just beginning to fly, and a rough estimate convinced us that there were certainly some millions of them. We spent the greater part of one day watching them. The young cormorants waddled to the bluffs, spread their wings evidently for their first trial, and sailed or flew awkwardly into the ocean. There they were perfectly at home and could not be distinguished from the old birds, swimming and diving with perfect ease. But the pelicans had a harder time. They could fly very well indeed, but like the Irishman "had a divil of a toime loighting." Starting from some slight elevation they would sail away majestically, managing their great wings and bodies remarkably well. After a turn of one or two hundred yards they would light without slowing up perceptibly, come down with a thud that we could hear a hundred yards away; turn two or three somersaults, and straighten up with the same appearance of surprise and offended dignity which we have all seen drunken men assume when suffering from similar mishaps. We actually laughed till we cried, and it was hours past our dinner time before we could agree unanimously to start for the boat.

Running easterly at a tangent from the southerly edge of the island for nearly 1000 yards is the so-called breakwater, a nearly straight line of enormous beach-worn boulders arranged like some huge artificial jetty. The acute angle has filled in with sand over a space of about fifty acres. In the bight there is safe anchorage except in a northeast storm. At two places dips in the breakwater bring it below high tide level, one opposite the little harbor, and the

other opposite the sand bar, and here the constant tidal current has excavated a little circular bay, covering two or three acres. This bay and the breakwater, with another little bight not much over thirty feet across, furnished nearly the only good collecting ground on the island. Otherwhere I found only a few of those hardy shells capable of standing any amount of buffeting by the waves, Chitons and Limpets, an occasional *Chlorostoma*, and the *Monoceros lugubre* Sby., which is in evidence along the whole coast from Ensenada south.

Dredging at moderate depths gave little results, but some of my fishermen friends who spend much time about this island, which furnishes some of the great fishing of the coast, make a practice of bringing up to me rocks which they haul up on their lines from considerable depths, attached to kelp roots. I am, therefore, able to list a considerable number of deep-water species. It has seemed to me advisable to publish the following list of shells secured from this small island and its immediate vicinity as a contribution to our knowledge of geographical distribution. I have to thank Dr. Wm. H. Dall of the National Museum, and Mr. Henry Hemphill of San Diego, Cal., for determining a very large share of the species about which I was in doubt.

After commenting on the fact that many of the specimens which I sent to him were too young or too worn to be identified specifically, Dr. Dall writes, "There was a small *Rissoina* among the shells which we have had for some years from San Pedro, but had not named, and with your permission we propose to call it *R. Bakeri*, Dall and Bartsch. There are also some of the new *Pyramidellidæ* described in the paper on W. Am. *Pyramidellidæ* which Mr. Bartsch and I have in preparation."

Our return trip was made much more slowly than the outward one, as the prevalent wind made it a long tack to windward. The only break was a night run against a sharp storm to make the doubtful shelter of Santo Tomas, where we lay for twenty-four hours with two anchors out, estimating the chances of a shift of the wind driving us to sea again. Our cruise lasted seventeen days, and was unanimously voted a success.

A NEW NAIAD FROM NEW ZEALAND.

BY CHARLES T. SIMPSON.

Diplodon websteri Simpson.

Shell long, rhomboid, compressed or subcompressed, inequilateral; beaks subcompressed, pointed, their sculpture apparently a few irregular lachrymose nodules arranged in a somewhat radial pattern; surface with uneven growth lines and impressed rest marks, sculptured throughout with lachrymose nodules which are often V-shaped, those along the upper part of the low posterior ridge slightly knobbed; epidermis dark olive green, clouded with lighter green, rather dull; pseudo-cardinals small, subcompressed, granulose, two in each valve; laterals straight, two in the left valve, one in the right; muscle scars small, shallow and irregular; nacre bluish, lurid purple near and in the beak cavities, thicker in front.

Length 67, height 32, diam 14 mm.

Length 62, height 32, diam. 17 mm.

New Zealand.

Specimens of the above were sent by Rev. William H. Webster, of Wauiku, New Zealand, to the U. S. National Museum. They proved to be a new species, apparently allied to the *Diplodon novæ-hollandiæ* Gray of Australia, but smaller, less inflated and less solid than that species. In *D. novæ-hollandiæ* the anterior third of the shell is almost destitute of nodules; in the present species the whole surface is covered with them. These resemble somewhat those found on the *Unio tuberculatus* of Barnes, but are less elevated. The exact locality was not given.

NEW AMERICAN LAND SHELLS.

BY HENRY A. PILSBRY.

Most of the following species were discovered by Mr. Jas. H. Ferriss during a recent flying visit to the Southwest. I am indebted to Mr. G. H. Clapp for various suggestions regarding them; both Mr. Clapp and Mr. Ferriss agreeing with me that they are new.

Polygyra alabamensis n. sp.

Shell depressed, about like *P. vannostrandii* in general contour,

yellowish brown, glossy, finely rib-striate above and below; umbilicate. Spire low dome-shaped. Whorls about 6, *very closely coiled*, the last having the periphery situated high; a trifle deflexed in front. Aperture oblique, lunate; peristome white, narrowly reflexed, thickened within, the outer lip bearing a small, squarish tubercle, bent inward; basal lip bearing a marginal tubercle, abrupt on its outer, sloping or battressed on its inner side. Parietal lamella short, erect, a trifle curved. Alt. 6, diam. $11\frac{1}{2}$ mm.

Auburn, Alabama. Types no. 82556 A. N. S. P., collected by Carl F. Baker.

The aperture is exceedingly similar to that of *P. inflecta*, from which this species differs in the sculpture, closely coiled whorls and open umbilicus. *P. cragini* is more depressed, with fewer whorls. *P. vannostrandii* has differently proportioned teeth and less closely coiled whorls.

Polygyra texasensis n. sp.

Shell narrowly umbilicate, but the umbilicus rapidly enlarging at the last whorl, where it becomes more than one-fourth the diameter of the shell; depressed, light brown, glossy, lightly and rather distantly striate, usually with several coarse, strong wrinkles behind the lip. Spire low, convex. Whorls $5\frac{1}{4}$, slightly convex, slowly widening, the last abruptly descending in front, deeply and narrowly constricted behind the lip, convex beneath. Aperture small, oblique; peristome reflexed, thickened, the outer and basal lips each bearing a compressed tooth, parietal wall with a strong, erect V-shaped tooth which connects the ends of the lip, the upper branch of the V slender and low.

Alt. 5, diam. 13.5 mm.

Alt. 5, diam. 12.3 mm.

Colorado City, Mitchell Co., Texas. Types no. 83258, A. N. S. P., collected by J. H. Ferriss, 1902.

This species is clearly related to *P. texasiana* (Moricand), which occurs at the same locality, as well as throughout the greater part of Texas. It differs from *texasiana* in the larger size, with about the same number of whorls, the more regular increase of the whorls in width, and the proportionally wider umbilicus. In the great number of *P. texasiana* I have seen from many localities, none approach *P. texasensis*.

Sonorella granulatissima n. sp.

Shell depressed, in general shape much like *S. hachitana* and *S. rowelli*; narrowly umbilicate, the umbilicus between one-eighth and one-ninth the diameter of the shell; pale corneous-brown, becoming somewhat whitish around the umbilicus, with a conspicuous red-brown band above the periphery, and an inconspicuous, ill-defined, faint and wide one below the suture on the last whorl. Surface lustrous to the naked eye, but not glossy, under a strong lens seen to be *very densely and evenly granulose*, the granulation extending to the apex, but becoming more effaced on the base, subobsolete around the umbilicus, where some specimens show faint spiral lines. Spire very low. Whorls hardly $4\frac{1}{2}$, rather slowly widening at first, the last whorl very much wider, gradually and rather deeply descending in front, far below the periphery of the shell. Aperture very oblique, very shortly elliptical, almost circular, the peristome thin, narrowly expanded, the columellar margin dilated, ends approaching.

Alt. 10, diam. 19 mm.; oblique alt. apert. 9.7, width 11 mm.

Alt. 9.8, diam. 18 mm.; oblique alt. apert. 8.5, width 9.8 mm.

Huachuca Mts., Arizona; collected by Mr. Jas. H. Ferriss.

The umbilicus is narrower than in *S. hachitana* and *S. rowelli*, and it differs from both in the dense granulation. It is a species of delicate beauty, evidently distinct from any form collected by Ashmun and others in the same region.

Sonorella rowelli Newc., originally described from Arizona, was taken by Mr. Ferriss at Sanford, and in the Patagonia Mts. Mr. Ashmun also brought the species from the latter locality, and Dr. Geo. H. Horn collected a specimen at Fort Grant, Arizona. It is much like *S. hachitana* in miniature.

Mr. Binney rejected *rowelli* from the U. S. list because he considered it identical with *Helix lohrrii* of Gabb from near Moleje, Lower California; but the two species are clearly distinct, and there seems to be no sufficient reason to doubt the truth of the original statement that the type of *rowelli* was taken by Frick in Arizona.

Bulimulus dealbatus pasonis n. subsp.

Much more slender and smaller than any described form of *dealbatus*, *schiedeanus* or *mooreanus*, but larger and stouter than *B. durangoanus* v. Mart. Reddish-corneous, with opaque white streaks and mottling; smoothish. Whorls nearly 6, quite convex. Aper-

ture small, ovate, less than half the length of the shell, the ends of the lip approaching. Length 15, diam. 7.3, longest axis of aperture 6.5 mm.

El Paso, Texas. Types no. 83259, A. N. S. P., collected by Jas. H. Ferriss, 1902.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF THE CHICAGO AREA: Part II., The Gastropoda. By Frank Collins Baker, Chicago Academy of Sciences. Bull. No. III, pt. II.

This handsome volume of 288 pages and 9 plates, which completes Mr. Baker's work on the Mollusca of the Chicago Area, will be a most welcome addition to the library of every American conchologist.

It has been for years a source of regret to all students of the American mollusca that so little attention has been given by our leading conchologists to the study of our fresh-water species. For more than thirty years practically nothing, except here and there a description of some supposed new form, has been published on this subject. The invaluable monographs published by the Smithsonian Institute have not only been out of print and scarcely attainable for years, but are quite out of date from a scientific standpoint. There is at present no work which gives the results of the material which has been accumulated in the public and private collections of this country, since the publication of those monographs, or embodies the modern ideas of classification. The land mollusks have apparently absorbed the attention of our working conchologists and the fluviatile forms have been almost totally ignored. The recent synopsis of the Naiades by Mr. Simpson has filled a long felt want, and placed that group in an enviable condition. The studies of Dr. Sterki are rapidly bringing the species of *Sphaerium* and *Pisidium* out of their chaotic condition. Similar work upon the fresh-water univalves is one of the greatest needs of American Conchology to-day. Mr. Baker's book is an important advance in the right direction, and should be an incentive for others to undertake similar work in other states. It is the first publication in this country, which attempts to treat the fluviatile forms with the same detail and thoroughness, which has been given to the terrestrial species. Both the author and the

Academy are to be congratulated upon the success with which the undertaking has been carried out.

Beginning with the *Pulmonata*, the land species, 51 in number, are first described, a sufficiently full synonymy of each is given with figures of the shell, and in nearly all cases of the jaw and radula. Full details of local distribution and of the habits and characteristic peculiarities of the different forms are also given. Pilsbry's classification is of course followed, and the whole treatment of the subject is in accordance with the latest scientific methods.

The most striking innovation in this portion of the work is the adoption of Say's name of *ovalis* for the species commonly known as *Succinea obliqua*. This is, however, in accordance with the recognized rules of nomenclature, and it is surprising that it has not been done before. The *Succineas* need a thorough revision. The specific characters exhibited by the shells are slight, and most of the described species seem to be exceedingly variable. It is possible that dissection will show reliable characters in the soft parts that can be relied on for specific determination. This work has yet to be done and would be a very valuable contribution to science. The jaws and radulæ if examined in sufficient quantities to determine the amount of variability in each species, might furnish a sufficiently reliable basis for classification. The difference shown between the author's figure of *S. ovalis* and Binney's figure of that of *S. totteniana* and that between his figure of the radula of *ovalis* and Binney's figure of the same, and the remarks on the same subject with reference to the published figures, the jaw of *S. retusa* is very suggestive, and shows the necessity for additional work in that line. It is unfortunate that the author did not make an original figure of the jaw of *S. avara*, as there is reason to believe that Morse's figure, adopted by Binney, is not correct.

The treatment of the fluviatile univalves is a welcome addition to the scanty literature on the subject. The only regret is that the fauna of the Area is comparatively small and that so many of our common species are not represented in it.

The keys supplied under the different genera serve to bring out the differential specific characters, and will be of great assistance to the student in identifying his specimens. The jaws and radulæ of many of the species are figured for the first time and many anatomical details of value are given. This branch of the subject is practi-

cally the first effort in a new field and forms the most valuable portion of the entire work. The synonymy is practically that of Binney with the addition of more recently described forms. Until a thorough revision of the subject can be made, based on abundant material from all parts of the country, and the study of the original types, this is no doubt the wisest course to pursue. The advisability of printing the MSS. names of Calkins, all of which seem to be synonyms, may be perhaps questioned.

The treatment of the *Linnæidæ* will in the main commend itself to the student. The author declines to follow Crandall in separating *Physa elliptica* Lea from *P. gyrina oleacea* Tryon. Judging from the figures given, it seems possible that *elliptica* as differentiated by Crandall does not occur in the Chicago Area. Certainly as species go in *Physa*, there is room for a difference of opinion on this subject. The elaborate descriptions of the *Pleuroceridæ* are worthy of notice, and are a refreshing improvement upon the descriptions that do not describe, of the older authors in treating of this most difficult family. The union of *Goniobasis depygis* to *G. livescens* seems a rather radical innovation and will likely provoke dissent. If it serves to incite discussion and careful study, it will have accomplished a useful purpose.

The author's figure of the radula of *Cincinnatia cincinnatiensis* is the first that has been published of that species. It is remarkable in not showing the "tongue shaped process from the middle of the anterior surface, reaching beyond the base," which is given by Stimpson as a generic characteristic of *Annicola*. If the figure is correct, *Cincinnatia* must be removed from under that genus and placed elsewhere. We do not understand the statement on p. 335 that figures 4 and 11 on Plate I. of Haldeman's Monograph are misnamed. In the copy before us, both the description and plate give the proper references. The author also seems in error in his remarks on page 336 in regard to Binney's figure 162 as copied from Troschel. Neither Binney nor Troschel refer the radula there figured to *Annicola cincinnatiensis* Anth. Both refer it, and probably correctly, to *A. sayana* Anth., which is a synonym of *Pomatopsis cincinnatiensis* Lea, an entirely different thing. The synonymy of the *Campelomas* is that established by Call and, barring the reference of Lea's *milesii* to *subsolidum*, is entirely acceptable. There is reason to believe that Lea's species should rather be referred to *decisum*. The large specimen figured as *decisum* on plate 36, fig. 5,

looks very much like *C. integrum*. Possibly that species should have been included in the Chicago fauna.

The paper concludes with a full bibliography of the literature of the Area, and a list of all the works referred to, which in itself will be of valuable assistance to the student who desires to familiarize himself with the literature, especially that published since Binney's Bibliography was issued.

BRYANT WALKER.

ENTEROXENOS OSTERGRENI, A NEW ENDO-PARASITIC GASTROPOD.—In the current number of the *Zoologische Jahrbücher* (xv, pl. 4, p. 731) a new parasitic gastropod of unusual interest is described by Kristine Bonnevie. It lives in the body-cavity of the N. European holothurian *Stichopus tremulus*, usually near the anterior end of the intestine, to which it is attached. The adult animal is vermiform, 6–15 cm. long, 4–5 mm. in diameter, without visible external opening, suddenly contracted anteriorly, into a slender style which is run into, and attaches it to the intestine of the host. The largest individuals sometimes lie free in the body-cavity. The integument is smooth, white and opaque. Under the epithelium there are circular and longitudinal layers of muscle. The internal anatomy is very simple. There is a narrow, long, central cavity, running backward from the end of the peduncle of attachment, the large ovary opening into it distally, while the testis lies anterior. The eggs are fertilized in the central cavity of the animal, and undergo development there. No trace of an alimentary canal is present. The gastropodous nature of the parasite is shown by the development and embryo.

The relationships of *Enteroxenos* are apparently with *Entocolax* and *Entoconcha*, but it is a more advanced evolution-product. The author gives provisional and guarded adherence to Schmiemanz's theory of the mode of derivation of *Entoconcha* from *Stylifer*-like ectoparasites, but wisely abstains from homologizing the parts of the endoparasitic forms with those of normal mollusks, preferring to leave open the questions of the homologies of the body-wall, style of attachment and central cavity.—H. A. P.

A REVISED CENSUS OF THE MARINE MOLLUSCA OF TASMANIA. By Prof. Ralph Tate and W. L. May. (Proc. Linnean Soc., New South Wales, pp. 344–471. Issued Dec. 19, 1901.)

This valuable contribution consists of an introduction to and history of marine conchology in Tasmania; a systematic list of species; a catalogue of synonyms with the corresponding names adopted; critical remarks on some species, and descriptions of two new species and one new genus—(*Legrandina*). The work is illustrated by five plates, containing 107 figures and 14 figures in text. A summary of admitted species shows: 10 Cephalopoda, 504 Gastropoda, 4 Scaphopoda and 157 Pelecypoda, a total of 653 species. It is a truly up-to-date catalogue, very few of the more recent improvements in nomenclature being overlooked.—C. W. J.

THE NAUTILUS.

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No. 4.

COLLECTING UNIONIDÆ IN TEXAS AND LOUISIANA.

BY L. S. FRIERSON, FRIERSON, LA.

In July, 1901, Dr. W. S. Strode, Mr. H. G. Askew, and the writer, took a trip through eastern Texas, collecting Unionidæ. Dr. Strode first took a "still hunt" on the Sabine river, at Loganport, where he duplicated the experience of the writer, the results of which have already been given the readers of NAUTILUS (xiii. 79). We met Mr. Askew at Sheperd, a small town northeast of Houston, and in close proximity to "Big creek," and Trinity river.

From Big creek we obtained a few *Lampsilis lienosus*. This shell had never before been obtained so far west, nor had it been listed as a Texas species by Mr. Singley. The Trinity river, though shallow at this time and place, was swift, with a sandy bottom, a combination not favorable to unionid life, and we had therefore poor luck. We obtained some magnificent *Quadrula pauciplicata*; big, glossy, black and nearly devoid of plications. They were otherwise interesting on account of the females being gravid, an unusual condition in this group. It is a true *Quadrula* in this respect. Some very fine *Q. trapezoides* were also taken. They were remarkably compressed, and some of them were likewise gravid. They bore their young (or eggs) in all four gills. This we believe has never before been noted, and effectually places this species in the genus *Quadrula*, as defined by Mr. C. T. Simpson, who placed it here without having the advantage of seeing a gravid female. We captured a trio of *L. amphichænus*, which extends both the habitat and size of this remarkable species, one of them being $5\frac{1}{4}$ inches in length. (The writer has since obtained a dead shell from the upper Brazos river.) A fine

series of shells were found which are in my cabinet as yet unnamed. They seem to be a perfect connecting link between *Q. aurea*, *houstonensis*, and *pustulata*. We were fortunate enough to find a couple of *Q. chunii*, Lea. This is the river in which the types were obtained and the specimens were typical in every respect. This shell is a very rare species, and one sadly abused. Whenever a uniologist gets a shell belonging to the group headed by *Q. trigona*, and about whose name he is in doubt, he at once dubs it *Q. chunii*. I may be rather harsh on my brother uniologists, but these two shells are my only *chunii* to date.

The next day we were at Nacogdoches, Texas. Here we saw the celebrated "Stone Fort," an ancient structure over whose walls the flags of seven governments have floated. How many of my readers must plead guilty, as I did, of never having heard of the Republic of Fredonia?¹ The full history of this structure was given us by Mr.

¹ In April, 1825, Hayden Edwards made a contract with the government of Mexico for the introduction of 800 families into Texas. They were to settle in the neighborhood of Nacogdoches, and be provided with lands under the general colonization law. The location proved unfortunate. Nacogdoches had been settled many years, partly by Mexicans and partly by a roving class of people who had a prejudice against the Anglo-Americans. When the colonists selected their lands and commenced improving, some older claimant would appear. The courts were appealed to, but would invariably decide in favor of the Mexican constituents. These conditions continued until finally (1826) the Mexican governor of the province decreed the annulment of the contract and the expulsion of Edwards and his brother from the territory. But Edwards had expended several thousand dollars in this enterprise, and his colonists too had expended considerable in building their homes. The Indians (principally Cherokees) also had settled near-by under the provisions of the colonization laws, and being greatly dissatisfied, allied themselves with the Edwards colonists, who, assuming the name of Fredonians, declared their independence of Mexico. They proceeded at once to organize a legislative committee composed of eight Americans and five Indians. Learning that Col. Bean was preparing to resist their movements, they took possession of the old stone fort. Norris, the deposed Mexican Alcalde, collected some friends and on Jan. 4, 1827, entered the town; they were attacked by the Americans and Indians and driven off with a loss of one killed and several wounded. The Fredonians were sadly disappointed in not receiving the co-operation of the Austin colonists, who joined the 200 soldiers sent from San Antonio to suppress the infant republic. Seeing the hopelessness of maintaining the Republic of Fredonia, Major Edwards and his forces retired across the Sabine into the United States and disbanded.

We are indebted to Mr. Askew for the above notes from Thrall's History of Texas.—EDITORS.

Askew, who is as loyal a son of Texas as ever drew breath. It is a shame to the town that this fort has been recently torn down and replaced by a sordid brick store. As soon as we had breakfasted, we went to the La Nana creek, where we obtained the new species, *Q. lunanensis* recently described. We also obtained a number of the most deeply corrugated *Q. laticostata* we have yet seen. A solitary *Obovaria castanea* was taken. Numbers of *Tritogonia tuberculata* were found, but much to our disappointment, not a single gravid female was noted. (This species has not as yet been observed in that condition.) In this creek we obtained some *L. nigerrimus* and *Strophitus edentulus*, neither of which was listed by Mr. Singley. While cleaning up our catch in the hotel yard, we were joined by an intelligent-looking party who gravely asked if the "fossils" we were cleaning belonged to the Devonian formation! I shall never forget the guileless look of the doctor, as he gravely replied that they *did*.

By high noon next day we were at Rockland on the Neches river; we had taken our dinner, and by 5 p. m. were loaded with all the unios we wanted. This place is the metropolis of *Q. askewii*, of which some examples require a "Philadelphia lawyer" to differentiate from *Q. beadleanus*. The unios of this river are precisely the same as in the Sabine river. We obtained some *bona-fide* *Q. nodifera*, a species of the validity of which we had had doubts, but these are now forever laid aside. From Rockland we then took flight towards Lake Charles (Louisiana). En route we were compelled to stop over at Beaumont, Texas; while there we were fortunate enough to witness the striking of oil by one of the wonderful "gushers" of that place. It was a grand sight, the memory of which will never leave us. Lake Charles we found to be a shallow expansion of the Calcasieu river, about two miles wide, with sandy bottom, and covered by floating masses of the "Water Hyacinth," acres and acres of them. Calcasieu river is an extraordinary stream; for fifty miles it is sixty feet deep and a quarter of a mile wide, with no current excepting after rains, and not a shoal or sand-bar. The salt water comes up 40 or 50 miles during storms, and kills most of the fresh-water shells.

Those left alive were the following: *Q. apiculata* (typical), *Q. mortoni*, *L. texasensis*, *L. hydiana*, *L. anodontoides*, *Q. trapezoides*, variety *pentagonoides* (new var.), and finally *Glebula rotundata*. I have in my cabinet two specimens of fresh water mussels (*Unio*)

having growing on them a shell of the salt water mussel (*Mytilus*); both host and mess-mate were alive when taken.

The *G. rotundata* were unusually fine, the shades of color exhibited by them I have never seen excelled. These were otherwise interesting as a number of them were gravid, and we felt all the importance of being true discoverers, as no student had ever before noted them in this condition. As regards this part of their physiology they are a true *Lampsilis*. The possession however of several unique characteristics will probably keep them in a separate genus.

Mention was made above of a new variety of *Q. trapezoides*. This shell differs from the type in having its dorsum very much arched or bent midway. The posterior is *widely* biangulated. The anterior is singularly truncated like *W. coruscus*, Gld. The effect being that the outline forms nearly an *equilateral pentagon*, hence the name. Aside from its form, it differs in being much smaller, and frequently entirely devoid of plication on either its sides or posterior slope. A striking peculiarity is that the posterior end of the ligament is perpendicularly over the centre of the base, whereas in the ordinary *trapezoides* the end is situated about three-fourths of the distance from the anterior to the posterior.

LIST OF SHELLS COLLECTED ON SAN MARTIN ISLAND, LOWER CALIFORNIA, MEXICO.

BY FRED. BAKER, M. D.

Loligo sp? Giant squid.	Monoceros lugubre Sby.
Cavolina tridentata Gmel.	Marginella regularis Cpr. 30 fathoms.
Cerostoma nuttalli Conr.	Marginella jewettii Cpr. Drift.
Ocenebra circumtexta Stearns.	Marginella pyriformis Cpr.
Ocenebra gracillima Stearns.	Volvarina varia Sby. Drift.
Ranella californica Hds. 30 fathoms.	Olivella biplicata Sby.
Fusus luteopictus Dall. On breakwater at low tide.	Astyris gouldi Cpr. 30 fathoms.
Macron kellettii A. Ad.	Astyris aurantia Dall.
Macron lividus A. Ad.	Astyris gausapata Gld.
Nassa fossata Gld.	Astyris carinata, var. hindsii Rve.
Nassa perpinguis Hds.	Astyris tuberosa Cpr.
	Anachis penicillata Cpr.

<i>Engina carbonaria</i> Rve. 30 fathoms.	<i>Odostomia</i> (<i>Ivara</i>) <i>turricula</i> Dall & Bartsch.
<i>Amphissa versicolor</i> Dall.	<i>Miralda californica</i> Dall & Bartsch.
<i>Surcula carpenteriana</i> , var. <i>tryoniana</i> Gabb.	<i>Ividia armata</i> Cpr.
<i>Clathurella affinis</i> Dall.	<i>Mumiola amiantis</i> Dall.
<i>Mitromorpha filosa</i> Cpr.	<i>Chrysallida aequisculpta</i> Cpr.
<i>Mangelia interlirata</i> Stearns.	<i>Chrysallida cincta</i> Cpr.
<i>Mangelia variegata</i> Cpr.	<i>Oscilla aequisculpta</i> Cpr.
<i>Conus californicus</i> Hds.	<i>Littorina planaxis</i> Nutt.
<i>Cypræa spadicea</i> Gray.	<i>Littorina pulchra</i> .
<i>Polinices uber</i> Val.	<i>Littorina scutulata</i> Gld.
<i>Crepidula aculeata</i> Gmel.	<i>Lacuna unifasciata</i> Cpr.
<i>Crepidula aculeata</i> , var. <i>californica</i> Nutt.	<i>Diala marmorea</i> Cpr.
<i>Crepidula dorsata</i> , var. <i>ligulata</i> Gld.	<i>Bittium armillatum</i> Cpr.
<i>Crepidula rugosa</i> Nutt.	<i>Bittium attenuatum</i> Cpr.
<i>Capulus</i> sp?	<i>Bittium esuriens</i> Cpr.
<i>Hipponyx antiquatus</i> Linn.	<i>Bittium quadrifilatum</i> Cpr.
<i>Hipponyx tumens</i> Cpr. In drift.	<i>Cerithiopsis columnæ</i> Cpr.
<i>Scala hindsii</i> Cpr.	<i>Cerithiopsis metaxæ</i> D. C.
<i>Scala tincta</i> Cpr.	<i>Cerithiopsis munita</i> Cpr.?
<i>Turritella goniostoma</i> Val.?	<i>Cerithiopsis tuberculata</i> Mont.
<i>Mesalia tenuisculpta</i> Cpr.	<i>Triforis adversa</i> Mont.
<i>Vermetus fewkesii</i> Yates.	<i>Cerithidea californica</i> Hds.
<i>Cæcum californicum</i> Dall.	<i>Rissoina aequisculpta</i> Cpr.
<i>Cæcum crebricinctum</i> Cpr.	<i>Rissoina bakeri</i> Dall & Bartsch.
<i>Cæcum læve</i> C. B. Ad.	<i>Rissoina infrequens</i> C. B. Ad.
<i>Cæcum oreuttii</i> Dall.	<i>Rissoina interfossa</i> Cpr.
<i>Eulima compacta</i> Cpr.	<i>Barleeia acuta</i> Cpr., banded var. 30 fathoms.
<i>Turbonilla similis</i> C. B. Ad.	<i>Barleeia haliotiphila</i> Cpr.
<i>Turbonilla tenuicula</i> Gld.	<i>Barleeia subtenuis</i> Cpr.
<i>Turbonilla torquata</i> Gld.	<i>Rissoa acutilirata</i> Cpr.
<i>Dunkeria gracilentia</i> Cpr.	<i>Rissoa aequisculpta</i> Cpr.
<i>Dunkeria laminata</i> Cpr.	<i>Alvania aequisculpta</i> Cpr.
<i>Odostomia nuciformis</i> , var. <i>avellama</i> Cpr.	<i>Alvania carpenteri</i> Weink.
<i>Odostomia americana</i> Dall & Bartsch.	<i>Alvania notabilis</i> Cpr.
	<i>Alvania purpurea</i> Dall.
	<i>Amphithalamus inclusus</i> Cpr.
	<i>Truncatella californica</i> Pfr.

<i>Truncatella stimpsoni</i> Stearns. ¹	<i>Ischnochiton magdalenensis</i> Rve.
<i>Liotia acuticostata</i> Cpr.	Rather common, but no large ones found.
<i>Liotia fenestrata</i> Cpr.	
<i>Ethalia supravallata</i> Cpr.	<i>Ischnochiton mertensii</i> Midd.
<i>Phasianella compta</i> Gld.	<i>Ischnochiton sarcosus</i> Dall.
<i>Phasianella compta</i> , var.	<i>Callistochiton crassicosatus</i> Pils.
<i>pulloides</i> . 30 fathoms.	<i>Callistochiton infortunatus</i> Pils.
<i>Eulithidium substriatum</i> Cpr.	<i>Mopalia muscosa</i> Gld.
<i>Pomaulax undosus</i> Wood.	<i>Lepidopleurus</i> (<i>Oldroydia</i>) <i>per-</i>
<i>Chlorostoma funebre</i> A. Ad.	<i>crassus</i> Dall. "Not in Pils-
<i>Chlorostoma gallina</i> Fbs.	<i>bry's Monograph."</i>
<i>Gibbula succincta</i> Cpr.	<i>Chaetopleura hartwegii</i> , var.
<i>Leptothyra bacula</i> Cpr.	<i>nuttalli</i> Cpr.
<i>Leptothyra carpenteri</i> Pils.	<i>Tornatina inculta</i> Gld.
<i>Leptothyra paucicostata</i> Dall.	<i>Tornatina harpa</i> Dall.
<i>Calliostoma splendens</i> Cpr.	<i>Tornatina recta</i> d'Orb.
<i>Trochiscus norrissii</i> Sby.	<i>Gadinia reticulata</i> Sby.
<i>Margarita acuticostata</i> Cpr. 30	<i>Helix stearnsiana</i> Gabb.
fathoms,	<i>Saxicava arctica</i> Linn.
<i>Scissurella rimuloides</i> Cpr.	<i>Semele decisa</i> Cour.
<i>Haliotis cracherodii</i> Leach.	<i>Cumingia californica</i> Conr.
<i>Haliotis fulgens</i> Phil.	<i>Tellina bodegensis</i> Hds.
<i>Fissurella volcanis</i> Rve.	<i>Macoma secta</i> Cour.
<i>Clypide'lla calliomarginata</i> Cpr.	<i>Petricola carditoides</i> Cour.
<i>Megatebennus bimaculatus</i> Dall.	<i>Venus fordii</i> Yates.? <i>V. toreuma</i>
<i>Acmæa persona</i> Esch.	Gld.
<i>Acmæa scabra</i> Nutt.	<i>Psephis salmonea</i> Cpr.
<i>Acmæa rosacea</i> . 4 fathoms.	<i>Psephis tantilla</i> Gld.
<i>Acmæa spectrum</i> Nutt.	<i>Tivela crassatelloides</i> Cour.
<i>Nacella incessa</i> Hds.	<i>Saxidomax nuttalli</i> Cour.
<i>Nacella paleacea</i> Gld.	<i>Tapes staminea</i> Cour.
<i>Williamia peltoides</i> Cpr.	<i>Chama exogyra</i> Cour.
<i>Lottia gigantea</i> Gray.	<i>Chama pellucida</i> Sby.
<i>Ischnochiton conspicuus</i> Cpr.	<i>Chama spinosa</i> Sby.

¹ In "NAUTILES," Nov., 1901, Dr. Pilsbry describes *T. stimpsoni guadalupensis*, found by Mr. R. E. Snodgrass in Nov., 1899, as the first specimens of this genus found on any of the islands off Lower California. The above two species were collected in August, 1899.

<i>Lucina californica</i> Cour.	<i>Modiola</i> (<i>Gregariella</i>) <i>opifex</i>
<i>Lucina nuttalli</i> Cour.	Say.
<i>Lucina tenuisculpta</i> Cpr.	<i>Septifer bifurcatus</i> Rve.
<i>Diplodonta orbella</i> Gld.	<i>Philobrya setosa</i> Cpr. 30
<i>Lasea rubra</i> Mont. 30 fathoms.	fathoms.
<i>Lasea rubra</i> Mont., var. sub-	<i>Lima orientalis</i> Ad. & Rve.
<i>viridis</i> Cpr. 30 fathoms.	Young, dead. 30 fathoms.
<i>Kellia laperousii</i> Desh.	<i>Pecten latiauritus</i> Conr. Young.
<i>Kellia suborbicularis</i> Mont. 30	30 fathoms.
fathoms.	<i>Hinnites giganteus</i> Gray. 30
<i>Milneria minima</i> Dall.	fathoms.
<i>Lazaria subquadrata</i> Cpr.	<i>Monia foliata</i> Brod. In <i>Hinnites</i> ,
<i>Arca gradata</i> Brod.	30 fathoms.
<i>Mytilus californica</i> Cour.	

NEW SPECIES OF PACIFIC COAST SHELLS.

BY WILLIAM HEALEY DALL.

Trivia atomaria n. sp. Shell minute, of a livid pink, with a substratum of olivaceous cast, the whole giving a pinkish brown effect; form subglobular, with a feeble dorsal sulcus, across which the ribs usually pass without interruption; in all there are about 18 ribs, with about equal interspaces, which are slightly sagriate or minutely irregularly rugose, though the ribs are smooth; these ribs form an equal number of fine denticulations on the inside of the outer lip and over the pillar-lip and internal lobe; the extremities are very slightly or not at all produced; the spire is completely obscured. Length 3.2, breadth 2.6, height 2.2 mm.

Half a dozen specimens of uniform size were dredged in 18 fathoms, Panama Bay, by the U. S. Str. Albatross. This is the smallest species I have seen; even the dwarfs of the allied *T. subrostrata* Gray of the West Indian fauna are larger.

Trivia panamensis n. sp. Shell small, strongly sculptured, subovate, inflated, with its posterior extremity slightly produced; sculptured with about 15 rather sharp-edged strong ribs, of which about 4 are intercalary and the others continuous over the shell; in the middle line of the back they dip slightly but are not interrupted or attenuated; aperture narrow, strongly and nearly equally toothed on

each lip; the spire wholly concealed; the interspaces are smooth and somewhat wider than the ribs. Length 4.2, breadth 3.0, height 2.5 mm.

Two specimens were obtained with the preceding. Both forms have been submitted to Mr. J. Cosmo Melvill, of Manchester, England, who now possesses the types of Gaskoin's species, and has given especial attention to the group. He regards both as new.

Erato oligostata n. sp. Shell small, very nearly the shape of *Trivia atomaria*, but not ribbed, of a pale olive green, with the extremity of the canal deep rose pink; spire entirely concealed by a microscopically pustulate layer of greenish white callus; aperture narrow, very slightly shorter than the spire and not angulate externally behind; pillar lip with two anterior pliciform and half a dozen small pustular more posterior deposits of callus, the outer lip minutely dentate, the teeth smaller in front; the canal very short. Length 3.2, breadth 2.25 mm.

Found with the preceding. This is perhaps the smallest known *Erato*, and while, perhaps, nearest to dwarf specimens of the West Indian *E. maugeriæ* Gray, it differs from them in its more rounded form and less trigonal outline, as well as by the pustulated surface.

The European genus *Mysia* (Leach) Lamarek, of which the type is *Lucinopsis undata* Forbes and Hanley, has two right and three left cardinal teeth. A very similar type is found in American waters, represented in the Antilles by *Artemis tenuis* Recluz, and on the Pacific coast by *Dosinia subquadrata* Hanley. These forms however differ from *Mysia* by having three cardinal teeth in each valve. For this American type I propose the name of *Cyclinella*, and add the following new species to the fauna of the Pacific coast.

Cyclinella singleyi Dall. Shell solid, nearly orbicular, yellowish white, with an extremely thin periostracum, moderately inflated; surface with very fine close concentric sulci, giving a silky texture to it; an obscure depression radiates from the beaks near the posterior margin; lunule lanceolate, defined by an impressed line; pallial sinus narrow, high, rather blunt, pointing at the umbo; internal margins plain, the middle cardinals strong, the posterior right cardinal bifid. Length 40, height 39, diameter 22 mm.

Gulf of California in the Yaqui delta; Singley. It is smaller, more convex and solid, with vastly larger muscular scars than *C. subquadrata* Hanley.

NEW LAND MOLLUSKS OF THE JAPANESE EMPIRE.

BY HENRY A. PILSBRY.

Eulota (Aegista) minima n. sp.

Shell openly umbilicate, depressed, convex above and below, broadly rounded at the periphery, light yellowish-brown. Surface densely covered with fine, short cuticular scales, readily rubbed off. Whorls about 5, convex, separated by an impressed suture, slowly increasing, the last wider, convex beneath, not noticeably descending in front. Aperture broadly crescentic, oblique; peristome slightly thickened, very narrowly expanded and subreflexed. Alt. 3, diam. 6.3 mm.

Ōshima, Ōsumi. Types no. 83,369 A. N. S. P. from no. 929 of Mr. Hirase's collection.

Much smaller than any other Japanese species of the group, but a true *Aegista* in form and sculpture.

Eulota (Plectotropis) hachijoensis n. sp.

Shell narrowly umbilicate, biconvex, acutely carinate, pale brown or whitish corneous. Surface glossy, finely and faintly striate, and under a lens seem to be very closely and distinctly engraved with spiral striae beneath, more obsoletely so above. Whorls $4\frac{1}{2}$, moderately convex, the last descending below the keel in front, slightly concave above and below the peripheral keel. Aperture oblique, irregularly oval; peristome slightly expanded above, reflexed below, scarcely thickened, the ends somewhat approaching. Alt. 5.4, diam. 10 mm.

Hachijo-jima, Izu. Types no. 83,368 A. N. S. P., from no. 943 of Mr. Hirase's collection.

The pale color of the somewhat translucent, acutely carinate shell, and its beautiful sculpture of spiral striae beneath are the more prominent features of this species. It has the shape, but not the surface, of *Plectotropis*, and does not seem closely related to any of the known species from the adjacent islands of Japan, but resembles closely the Riukiu species *E. inornata* Pils., differing chiefly in the smaller number of whorls.

Eulota (Aegista) aperta var. *mikuriyensis* nov.

Similar to var. *trachyderma* Pils. & Gude, but more elevated and covered with very much coarser, less crowded, ragged cuticular

scales, or where they are rubbed off the surface is roughened with comparatively coarse, short striae. Whorls $5\frac{3}{4}$; periphery subangular at the beginning of the last whorl. Peristome thin, narrowly expanded and subreflexed. Alt. 7.5, diam. 12.5 to 13 mm.

Mikuriya, Suruga. Types no. 83317 A. N. S. P., from no. 937 of Mr. Hirase's collection.

The peristome of this species is of the same character of that of *trachyderma*. Mr. Gude dissents from the course I took in subordinating *trachyderma* to *aperta*. He writes: "I decidedly consider *trachyderma* as more nearly related to *minula* than to *aperta*. Only look at the peristome, which is so decidedly thickened in *aperta* (and you must remember that your types of *aperta* were immature shells). If you will examine them again I think you will agree with me, and if *trachyderma* must be degraded to varietal rank, by all means place it under *minula*" (G. K. G. in litt. Jan. 7, 1902).

I am now much disposed to adopt this view; but pending a thorough study of the group, I allow the published status of the form to remain.

Eulota (Plectotropis) mackensii var. *formosa*, nov.

Shell similar to *E. mackensii* and *vulgiraga* except that the umbilicus is less widely open and the lower margin of the lip is less deeply curved. Alt. $10\frac{1}{2}$, diam. $23\frac{1}{2}$ mm., whorls $6\frac{1}{2}$.

Taihoku, Formosa. Types no. 83332 A. N. S. P., from no. 429 of Mr. Hirase's collection.

Schmacker & Böttger have already commented upon this Formosan form of *mackensii*, which they had from Tamsui (Nbl. D. Mal. Ges. 1890, 136).

Eulota (Caelorus) cariconus Pils.

NAUTILUS XV, p. 117 (February, 1902). The locality should be Goto, Hizen, in Kyūshū. Mr. Hirase has sent specimens from Ojika-jima, Hizen (no. 928), which are a little larger than the type lot, diam. 7.6 mm.

Eulota submandarina var. *compacta* nov. Differs from the typical form by the larger umbilicus, more elevated spire of $6\frac{1}{2}$ very convex whorls; very solid, light chestnut colored, without a peripheral band. Lip expanded and strongly thickened within. Specimens measure: Alt. 19.5 to 20, diam. 21.5 mm., and alt. 19, diam. 22.5 mm.

Yakushima. Types no. 82498 coll. A. N. S. P., from no. 777 of Mr. Hirase's collection.

Hirasea major n. sp. Shell depressed, lens-shaped, brown, dull and densely, finely obliquely striate above, paler, somewhat glossy and more faintly striate beneath. Spire convex; whorls 5, but slightly convex, the suture superficial, filled by the peripheral keel; last whorl very acutely carinate, the keel narrowly projecting, base convex, deeply impressed in the middle. Aperture oblique, obscurely trapezoidal-lunate, the peristome thin in the specimens seen. Alt. 3.3, diam. 6.7 mm. Chichijima, Ogasawara (Mr. Y. Hirase, no. 865). Much larger than the related *H. hypolia*, less polished below, and with a more acute peripheral keel. The specimens may not be fully mature.

Hirasea diplomphalus var. *latispira* n. var.

Similar to the typical form except that the spire is wider and less sunken. Chichijima.

Hirasea profundispira n. sp.

A species similar to *H. diplomphalus*, but differing in the much narrower spire, not one-third the diameter of the shell, and quite deeply sunken. Alt. 2.3, diam. 3.3 mm. Chichijima.

TWO NEW BULIMINI FROM CENTRAL ASIA.

BY C. F. ANCEY.

1. *Buliminus larvatus*, Anc.

Shell rather solid, cylindrical, attenuated and conic towards the apex, with an oblique and compressed umbilical fissure, somewhat shining, whitish flesh-colored, with irregular and oblique rather straight stripes of a darker hue. Apex brownish or horn-colored. Spire produced, obtuse. Whorls $7\frac{1}{2}$ –8, slowly increasing, not much convex, suture simple, not deeply impressed; the first 4 or 5 whorls gradually becoming broader, the following of nearly the same diameter, the last one cylindrical, compressed near the chink and obscurely and obtusely angular at the base, not ascending in front. Aperture oval, angulated superiorly, a little oblique. Peristome thickened and labiated internally, but slightly expanded, more broadly so at the columella. Margins distant, the columellar one simple and arched. Parietal callosity more or less conspicuous, sometimes thickened on each side.

Length $14\frac{1}{2}$ – $15\frac{1}{2}$, diam. $5\frac{1}{2}$, length of apert. 5 mm.

Loc.: Valley of Urmara, Talas-Alatan, Turkestan. Alt. 8500 feet (O. Rosen).

A distinct form, recalling in shape *Bul. Kuschakewitzi*, Anc., of Namangan, Khanat of Khokand, but very distinct and with the peristome less developed.

Some of the *Bulimini* that I have described from the same countries bearing only the very vague locality, Turkestan, I now avail myself of the opportunity of mentioning the precise localities of:

Bul. Ujfalvianus, Anc., Usgent.

Bul. Turanicus, Anc., Usgent.

Bul. trigonochilus, Anc., Samarkand.

Bul. Annenkowi, Anc., Margelan.

Bul. Kuschakewitzi, Anc., Namangan.

Bul. Bomalotianus, Anc. (emend.), Alai. A smaller, highly colored variety which I propose to call var. *colorata*.

Bul. intumescens is also found at Osch, Eastern Turkestan, with *Bul. albiplicatus*, von Mart. The former appears to be a widely spread species.

2. *Buliminus albocostatus*, n. sp.

Shell small, rather thick, slender, cylindrical, turreted, rimate, shining, brownish horn-color or brownish, sculptured with strong, numerous, rather regular, white folds. Apex obtuse, smooth, horn-colored. Spire long, regularly attenuated, subcylindrical below. Whorls 8-9, somewhat convex, slowly increasing, suture simple, moderately impressed; the last whorl not much broader than the preceding one, barely attenuated or narrowed towards the base, minutely ascending in front. Aperture nearly vertical, ovate, sometimes produced externally, angulated superiorly. Peristome white, thickened, superiorly straightened, flatly expanded, margins not distant, joined by a heavy callosity. Columella simple, internally simple, not folded, externally broad.

Length $8\frac{1}{2}$ -10, diam. 3, length of apert. $2\frac{1}{2}$ mill.

Loc.: Valley of Karagoin, Turkestan (O. Rosen).

A charming and sharply defined, graceful species which I received at first labeled as "*Bul. albiplicatus*, von Mart., variety," and subsequently as "*Bul. albiplicatus*, West." I am not aware it was ever published by Westerlund. From *B. albiplicatus* it differs in being smaller, more slender and the characters of aperture, as well as the relative proportions, are altogether dissimilar.

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NOTES ON TASMANIAN AND WEST INDIAN CONCHOLOGY.*

BY C. HEDLEY, F. L. S.

The study of Tasmanian conchology has been facilitated by an excellent catalogue published last year by the late Prof. Tate and Mr. W. L. May in the Proceedings of the Linnean Society of New South Wales. Therein certain species ascribed to Tasmania by the Rev. J. E. Tenison Woods were rejected from the fauna chiefly because no later observer had taken them. Though apparently of foreign origin, their exclusion could not be wholly justified until that origin was ascertained. At the invitation of Messrs. A. Morton and W. L. May I undertook their examination. From the result it appears that five West Indian species were supplied to Tenison Woods, which he erroneously described as Tasmanian, and as new to science. They are :

Pleurotoma weldiana, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 137, identical with *Drillia fucata*, Reeve, Conch. Icon., pl. xx, f. 169.

Ethalia tasmanica, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 146, is the common West Indian *Modulus modulus*, Linne.

Adeorbis picta, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 146, is *Chlorostoma fasciatum* Born. Wood's type answers well to fig. 2a of pl. 63 of Fischer's Monograph in the "Coquilles Vivantes."

Astele turbinata, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 145, is *Chlorostoma scalare*, Anton, another well-known West Indian shell.

Semele werburtoni, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 158, is *Codakia orbicularis*, Linne, a common Antillean species.

* From the Proceedings Royal Society of Tasmania for 1902.

FOSSIL LAND SHELLS OF THE OLD FOREST BED OF THE OHIO RIVER.

BY A. C. BILLUPS, LAWRENCEBURG, IND.

During the spring of 1902, owing to the unusually heavy rains which caused much cutting to be done on the banks of the Ohio and Great Miami rivers, near Lawrenceburg, Indiana, I had a fine opportunity to examine this interesting formation, the Old Forest bed, from a conchological point of view.

I had many years previously found large numbers of broken and bleached shells of species which are foreign to this locality in drift piles of the Great Miami and Ohio rivers, which I had always put down as dead specimens which had floated from some point far above where they were found. I found that this conclusion was erroneous and that these shells were washed from the deposit which contained them, and floated to the various drift piles where they first attracted my attention.

The Old Forest bed is a stratum of several feet in depth, six to eight feet below the present surface of the bottom lands of the Ohio, and contains in many places the well-preserved remains of mammoth trees; these are covered with a thick layer of yellow clay of an exceedingly hard and solid texture, which renders very difficult the extraction of fossils so delicate in structure as the land shells. About the only satisfactory way to obtain good specimens is to wash out with water until the clay is softened and then, if good luck follows you, you may obtain a respectable specimen. The use of a knife or chisel is absolutely useless, as in nearly every case the fossil extracted by these means is cracked or broken.

The comparison between these fossil forms and the species now found in this section is extremely interesting and worthy of study. To give a general idea of the species and to illustrate the difference between the fossil and recent faunas, I give the following list with notes on each species, which will show clearly what time has done to modify the molluscan fauna to the changed conditions of the present time.

It is remarkable how well the red coloring matter of all species is preserved, particularly in the case of *P. alternata* Say.

Vallonia pulchella Mull. Traces only of this minute shell.

Polygyra tridentata Say. Not many found, and these much more elevated and more deeply striated than the local living specimens.

Polygyra tridentata Say. Variety, region of the mouth much compressed and very deeply striated.

Polygyra inflecta Say. A few broken specimens.

Polygyra profunda Say. Very large well-preserved shells, heavy, and bands very plainly marked.

Polygyra albolabris Say. Very scarce.

Polygyra exoleta Binn. Common and of usual form.

Polygyra multilineata Say. Perhaps about the most plentiful of all the species found. This shell has never been found alive within twenty miles of this deposit.

Polygyra palliata Say.

Polygyra appressa Say. Several broken specimens.

Polygyra elevata Say. Fairly common and well preserved.

Polygyra pennsylvanica Green. Quite common in the deposit, but rare in this vicinity alive, only ten or twelve specimens having been found in the last six years after careful search.

Polygyra thyroides Say. Good specimens and fairly common.

Polygyra mitchelliana Lea. Common in the deposit, but rare and very local alive, only one locality known near Lawrenceburg.

Polygyra stenotrema Fer.

Polygyra monodon Rack. Very rare.

Pupoides marginatus Say.

Bifidaria contracta Say.

Bifidaria armifera Say. Common.

Cochlicopa lubrica Mull. A few broken specimens.

Circinaria concava Say. Quite common.

Vitrea hammonis Strom. Several broken shells.

Gastrodonta ligera Say. Common and in good condition.

Pyramidula alternata Say. Very large forms with distinct and beautiful color markings.

Pyramidula solitaria Say. Plentiful, large, heavy shells.

Pyramidula perspectiva Say. Rare.

Pyramidula striatella Anth. Rare.

Helicodiscus lineatus Say. Rare and broken.

Succinea sp. Very large, quite common, and in fine condition, nothing nearly as large found here alive.

Pomatiopsis lapidaria. Common. I have never taken this shell alive in the vicinity of Lawrenceburg.

Subsequent search will no doubt increase the numbers of this list,

as only those shells are mentioned which are perfect enough to render identification complete.

Poly-multilineata Say, which occurs plentifully in the middle portions of the State, seems at Lawrenceburg to be conspicuous by its absence, but is represented in the fossil state in large numbers, and is an exceedingly well-developed form for this species. In fact all these fossils are much larger and better developed than the species which are found alive here at the present time, with the exception of *Pol. albolabris* Say., which is in the deposits a very rare shell, but most abundant in the surrounding woods. This may be due to the fact that *albolabris* is a thin and fragile shell, and has not been able to withstand the pressure of the surrounding soil so well as *elevata* and its more solidly-built brethren. However, this theory would not seem to hold good, as *Succinea*, one of the most fragile land shells, occurs in numbers, of large size, and in a splendid state of preservation.

A NEW HELIX FROM CALIFORNIA.

BY J. ROWELL.

Epiphragmophora exarata var. *rubicunda* Rowell.

Shell umbilicate, conic, less depressed than *exarata*, rather thin, sculpture somewhat malleated, the malleation lying in ridges parallel with lines of growth, color dark chestnut-brown, with one black band, summits of ridges and malleation dark orange-red, interior ruby-red; whorls seven, rounded, suture impressed, the upper whorls much less wrinkled than in *exarata*.

Alt. 21, diam. 27-30 mm. (Occidental.)

Alt. 25, diam. $31\frac{1}{2}$ mm. (Freestone.)

Habitat, Sonoma Co., on a high, dry ridge, in the town "Occidental," on our "Cal. North Western R. R." I have visited the place three times, hoping to get other mature shells besides my original pair, but have searched in vain. All around are *exarata* proper and a few *infumata*, in the redwoods. But on my last trip, I stopped over at the town "Freestone," six miles this side of Occidental; I chose the place because there the redwoods and the open country meet, and I thought that for this reason it would be the right place for my shell, and a dense fog helping me, I was delighted to find quite a number of fine specimens.

A NEW FLORIDIAN HELICINA.

BY H. A. PILSBRY.

Helicina tantilla n. sp.

Shell very small, much depressed, finely and weakly striate. Spire low, convex, with rather straight outlines. Whorls $3\frac{1}{2}$, rather slowly widening, the last much wider, rounded at the periphery, convex beneath, impressed around the central callus. Aperture quite oblique, semi-circular, the lip obtuse, not noticeably expanded. Umbilical callus but slightly convex, not filling the cavity to the level of the surrounding convexity of the base. Alt. 1.3, diam. 2.5 mm.

Palm Beach, Florida. Type no. 77349 A. N. S. P., coll. by H. A. Pilsbry.

This tiny *Helicina* is quite distinct from all the Antillean species I have been able to compare. A single bleached specimen was gathered in June, 1899, with other small land shells, in the woods about a quarter of a mile from the Atlantic beach. I did not notice it at the time, or I would have made search for more; it was only detected when the material was being sorted at home. No further specimens have turned up in the three years since this one was taken, and it is now published in the hope that some reader of the NAUTILUS who may visit that most beautiful of the winter resorts of east Florida, may search for the species, and complete the description by finding living specimens. It has no resemblance to the young of *H. orbiculata*.

NEW LAND MOLLUSKS FROM THE JAPANESE EMPIRE.

BY H. A. PILSBRY.

Alycaeus vinctus n. sp. Moderately umbilicate with conic spire and the general aspect of other described Japanese species of *Alycaeus*. Whorls $3\frac{2}{3}$, the first $1\frac{1}{2}$ smooth, corneous-brown, following whorls dull, whitish, sculptured with lamellar rib-striae and finer spiral threads, the riblets as usual much more crowded on the back of the last whorl. Constriction of neck rather strongly marked, and with the portion following it, smooth, free from riblets, or with weak striae only. "Tube" long, reflexed, lying in the suture.

Aperture oblique, circular, the peristome blunt, continuous, strengthened by a *very strong external rib* which is beveled to the lip-edge. Operculum yellow, thin. Alt. 2.7; diam. 3.6 to 4 mm. Tanegashima, Osumi. (Mr. Hirase, no. 916.)

Readily distinguished by the excessively heavy collar behind the lip and the comparatively conspicuous spiral threads. (*Vinctus*, bound, in allusion to the heavy, hoop-like lip-rib.)

Macrochlamys semisericata n. sp. Shell perforate, moderately depressed, dark reddish-brown, thin and somewhat translucent; the surface polished below, dull with a silken sheen at the periphery and above. Sculpture of excessively fine, close, slightly waved, parallel, slightly oblique rib-striae above, extending from the apex to below the periphery, the base smooth. Whorls $4\frac{1}{2}$, slowly increasing, convex, separated by an impressed suture, the last much wider, rounded at the periphery. Aperture oblique, lunate; peristome thin and simple, dilated at the columellar insertion. Alt. 3, diam. 5.2 mm.

Kurozu, Kii, Types no. 83374, A. N. S. P., from no. 935a of Mr. Hirase's collection. Slightly smaller specimens were found at Nachi, Kii, Mr. Hirase's no. 955.

Distinguished from *M. cerasina* v. *awaensis* and *M. tanegashimæ* by the silken lustre of the upper surface, produced by fine parallel striae. It is much smaller than *awaensis*. (*Semisericatus*, clothed half in silk.)

Zonitoides subarboreus n. sp.

Shell extremely similar to *Z. arboreus* (Say), from which it differs in the wider, less deeply lunate aperture, and the slightly wider umbilicus. The shell is brownish yellow. Surface glossy, irregularly striate, smoother below, without spiral striae. Whorls $4\frac{1}{2}$, convex, separated by an impressed suture. Alt. 2.7, diam. 6 mm., or slightly smaller.

Hachijo-jima, Izu. Types no. 83375, A. N. S. P., from no. 951 of Mr. Hirase's collection; collected by Mr. Nakada, 1902.

This species is more depressed than *Z. nitidus*, and the base is less convex. If found in the United States, the differences from *Z. arboreus* would hardly be noticed; but its location on an island over one hundred miles off middle Japan, together with the slight divergence noted above, seem to indicate a distinct species. (*Subarboreus*

might mean under trees, but here it refers to the resemblance to *Zonitoides arboreus*, one of the commonest snails of North America.)

Microcystina circumdata n. sp. Shell perforate, depressed, with low, conic spire, glossy, light yellowish-brown, somewhat translucent. Sculpture of slight growth-lines, and under a strong lens there are seen to be excessively minute, close, engraved spiral lines above, and shallow, weak, and much coarser spiral sulci beneath. Whorls $4\frac{1}{2}$, convex, slowly increasing, joined by an impressed suture, the last whorl rounded peripherally, impressed around the perforation. Aperture lunate, oblique; outer margin of the peristome thin and simple, the columellar margin thickened within, narrowly dilated at the insertion. Alt. 2, diam. 3.4 mm.

Hachijo-jima, Izu. Types no. 83376, A. N. S. P., from no. 949 of Mr. Hirase's collection.

This species is larger and less depressed than *M. yakuensis*, which resembles it more than any other species which I have compared. (*Circumdatus*, surrounded, *i. e.*, by the sea.)

Kaliella hachijoensis n. sp. Shell imperforate, globose-conic, smooth except for faint growth-striae, yellowish-brown. Spire conic with slightly convex lateral outlines, the apex obtuse. Whorls $5\frac{1}{2}$, convex, separated by an impressed suture, the last inconspicuously and bluntly angular at the periphery, convex beneath. Aperture lunate, but slightly oblique; peristome thin and simple, the columellar end reflexed, whitish. Alt. 2.7, diam. 3.4 mm.

Hachijo-jima, Izu. Types no. 83377, A. N. S. P., from no. 941 of Mr. Hirase's collection, collected by Mr. Nakada, 1902.

Kaliella pallida n. sp. Shell minutely perforate, depressed conic, glossy and smooth except for faint growth-lines, translucent, pale yellowish-corneous, becoming whitish towards the apex. Spire conoidal, the apex obtuse. Whorls $4\frac{1}{2}$, convex, the suture impressed. Last whorl rounded at the periphery, a little angular in front of the aperture, convex beneath. Aperture broadly lunate, the peristome thin and simple, triangularly dilated at the columellar insertion. Alt. 2.5, diam. 3 mm.

Hachijo-jima, Izu. Types no. 83378, A. N. S. P., from no. 952 of Mr. Hirase's collection.

These species are somewhat similar in contour to *K. nanodes* (Gude) and *K. reinhardti* (Pils.), but are apparently different from any of the described Japanese species. (*Pallidus*, pale.)

Situla latissima n. sp. Shell minutely perforate, low trochiform, dull brown. Surface nearly lustreless, showing two or three spiral cuticular threads on the upper surface of the last and next earlier whorls. Spire conic. Whorls $4\frac{1}{3}$, convex, separated by a deep suture, the last whorl angular at the periphery, flattened, only weakly convex beneath. Aperture oblique, somewhat square, the periphery thin and simple, dilated at the columellar insertion. Alt. 1.5, diam. 2.3 mm.

Yayeyama, Riukiu group. Types no. 83379, A. N. S. P., from no. 953 of Mr. Hirase's collection.

Distinct by its very broadly conic shape. (*Latissimus*, widest).

Pyramidula pauper var. *hachijoensis* n. var.

Shell low-conic above, convex beneath, higher than *P. pauper*, angular at the periphery; regularly rib-striate, dark brown. Whorls $4\frac{1}{4}$; umbilicus about one-fourth the diameter of the shell, being much narrower than in *pauper* or *depressa*. Alt. 3.7, diam. 6.5 mm.

Hachijojima, Izu. Types no. 83324, A. N. S. P., from no. 950 of Mr. Hirase's collection.

Although there is now a tendency to regard island races, where intergradation with the stem-form can not occur, as of specific rank, yet it seems to me that the relationships of such forms as this are best indicated by the use of a trinomial. The elevation of the spire and the narrower umbilicus readily distinguish this sub-species.

Buliminus luchuanus var. *oshimanus* nov. Shell similar to *B. luchuanus*, but differing in being thinner, with more conic spire, far less copious dark variegation, 7 to $7\frac{1}{2}$ whorls, and a thinner lip.

Length 18.3, diam. 7 mm.

Length 16.3, diam. 6.3 mm.

Oshima, Osumi. Types no. 83381 A. N. S. P., from no. 930 of Mr. Hirase's collection.

Buliminus hiraseanus n. sp. Shell rimate, egg-shaped, being short, broad and compact, the spire short, conic with convex outlines, apex obtuse; yellow or brown; surface minutely decussate. Whorls about 6, hardly convex. Aperture oblique, ovate; peristome white, expanded and somewhat reflexed, thickened within, a small nodule on the parietal wall defining a narrow channel at the upper angle. Length 8.5–9, diam. 5 mm. Mukojima, an islet southwest of Hahajima, Ogasawara. (Mr. Y. Hirase, no. 919.)

Diplommatina kobelti var. *ampla* Pils.

Proc. Acad. Nat. Sci. Phila., 1902, p. 28. The locality is Gotō, Hizen, not Uzen as given in the original description.

Carychium hachijoensis n. sp. Shell ovate-conic, whitish, slightly translucent, nearly smooth, the growth-lines being very faint. Spire conic, the apex obtuse. Whorls $4\frac{1}{2}$, convex, separated by a deep suture. Aperture ovate, a little less than half the length of the shell; the peristome reflexed, much thickened throughout, white; Outer lip bearing a strong tubercle on its inner margin above the middle; columella conspicuously truncate, ending below in a strong tooth-like fold, and bearing a stout, projecting lamella above. Length 1.5, diam. 0.8 mm.

Hachijo-jima, Izu. Types no. 83,382 A. N. S. P., from no. 946 of Mr. Hirase's collection.

This species differs from *C. noduliferum* Beinh. in its shorter spire of fewer whorls, the absence of striation, and the smaller size.

Tornatellina biplicata n. sp.

Shell imperforate, pyramidal, thin, brown, nearly smooth; spire straightly conic, the apex obtuse. Whorls $5\frac{1}{2}$, convex, separated by a well impressed suture. Aperture oblique, rather narrow, sometimes showing a strong narrow, white rib within; peristome simple; columella spiral, forming a strong callous fold; parietal lamella thin but high. Length 3, diam. 1.7 mm.

Hachijojima, Izu. Types no. 83,380 A. N. S. P., from no. 948 of Mr. Hirase's collection.

This species is more lengthened than *T. ogasawarana*, or *T. varicifera*, but less so than *T. nakadai* (*biplicatus*, two-folded).

Cochlicopa lubrica var. *hachijoensis* nov. Shell short and wide, with very obtuse apex; whorls $5\frac{1}{2}$. Length 6, diam. 2.7, length of aperture 2.4 mm.

Hachijo-jima, Izu. Types no. 83,383 A. N. S. P., from no. 940 of Mr. Hirase's collection.

LIST OF LAND SHELLS COLLECTED IN THE SACRAMENTO MTS., NEW MEXICO.

BY E. G. VANATTA.

During April and May of the present year Messrs. J. A. G. Rehn and H. L. Viereck collected natural history specimens in the Sacramento Mts., Otero Co., New Mexico, for the Academy of Natural

Science of Philadelphia. Collecting was done at Cloudercroft, in James Cañon, elevation 9500 feet, in the Canadian zone, where the following species were taken :

Ashmunella rhyssa hyporhyssa	Vitrina pfeifferi Newe.
Ckll.	Euconulus fulvus Müll.
Vallonia cyclophorella Anc.	Zonitoides arboreus Say.
Thysanophora ingersolli Bld.	Zonitoides milium Mse.
Pupa sonorana Sterki.	Punctum pygmaeum Drap.
Bifidaria pilsbryana Sterki.	Succinea avara Say.
Vertigo concinnula Ckll.	

Ashmunella rhyssa hyporhyssa Ckll. was found in great abundance under logs and branches at Cloudercroft, the type locality.

At Highrolls, Otero Co., New Mexico, elevation 7000 feet, in the Upper Sonoran zone, the following species were collected :

Ashmunella rhyssa hyporhyssa	Bifidaria armifera Say.
Ckll.	Zonitoides arboreus Say.
Vallonia cyclophorella Anc.	Succinea avara Say.

Holospira roemeri Pfr. and *Vitrea indentata umbilicata* "Singl." Ckll. were taken at 4600 feet elevation in the Middle Sonoran zone, in the Alamo Cañon near Alamogorda, Otero Co., New Mexico.

GENERAL NOTES.

LIMNÆA AURICULARIA IN AMERICA.—In *Science*, July 11, 1902, p. 65, Dr. R. E. Call records the occurrence of a well-established colony of this species in Flatbush, Brooklyn, N. Y. They were probably introduced on plants.

PLANORBIS PARVUS WALKERI n. var.

This variety is similar to *P. parvus*, but distinguished by having the lip internally thickened.

Types in coll. of Academy of Natural Sciences, no. 81143 from Hartland, Vt., gift of Mr. Bryant Walker; cotypes in coll. Walker.

It also occurs at the following Michigan localities: Oakland Co.; Detroit; Cambridge, Sewell Co.; Antrim Co.; Fenton, Genesee Co.; Lake near Charlevoix; and Grand Rapids, all communicated by Mr. Bryant Walker.—E. G. VANATTA.

VERTIGO COLORADENSIS AND V. INGERSOLLI.—In our Revision of Pupæ, 1900, pp. 599, 603, Mr. Vanatta and I stated that we had not seen the descriptions by Mr. Cockerell published in the *British Naturalist*, 1891. The missing number of that journal has now been

received, and as there are probably but few copies accessible to American conchologists, we reprint below the passages relating to American *Pupidæ*.

"In the 'Journ. of Conch.,' 1889, p. 63, a small species of *Pupa* from Colorado was named *P. coloradensis*, but not described. It is a distinct species allied to *corpulenta*, but decidedly smaller (length $1\frac{1}{2}$ mill.), more striate and slightly narrower. There are four apertural lamellæ, [p. 101] one on the parietal wall, one on the columella, and two—the lower one the largest—on the outer wall.

"*Pupa ingersolli* Ancey MS., mentioned on p. 64 of the same volume, has also never been described. It is allied to *coloradensis*, but 2 mill. long, cylindrical, dull brown, with half a whorl more,¹ and a double lamella² on the parietal wall. *P. montanella*, indicated on the same page as *P. coloradensis*, proves to be a form of *P. pentodon*—T. D. A. C." (The British Naturalist, 1891, part v. pp. 100, 101.)

The description of *P. ingersolli* is so abbreviated that in a critical group like the *modesta* group of *Vertigo* it may be doubted whether it is sufficiently diagnostic. Prof. Cockerell, who has affirmed the identity of *ingersolli* with his *concinnula*, seems to have held a different view when describing the latter. As the original description of *ingersolli* is only about two lines long, and quite inexact for *concinnula*, it may fairly be held, I think, that it was not recognizably defined, and the name *concinnula* should not be displaced.—H. A. PILSBRY.

ASHMUNELLA LEVETTEI (Bld.). Specimens of this species (formerly referred to *Polygyra*) were taken alive in the Huachuca Mts., Arizona, by Mr. J. H. Ferriss, and have been dissected by Mr. E. G. Vanatta. It proves to be a typical *Ashmunella* anatomically. Since this is the case, it is altogether likely that the related *Polygyra mearnsi* Dall will follow suit; so that *Ashmunella* will include numbers 84 to 89 of the check-list of 1897. It should be mentioned that Mr. C. F. Ancey had already, on conchologic or distributional grounds, referred *levettei* to *Ashmunella*, but Mr.

¹ It will be noticed in this connection that the number of whorls is not stated in the description of *P. coloradensis*. H. A. P.

² The term "a double lamella" may be applied to the parietal process of *Bifidaria procera*, *armifera*, *contracta*, etc., but it is conspicuously inexact when used for a species with two separate and distinct lamellæ upon the parietal wall, as in *Vertigo*. H. A. P.

Vanatta's investigation places the generic position of the species on an indisputable basis.—H. A. PILSBRY.

A LARGE PEARL.—A short time ago, one of the students of the Southern Collegiate Institute, of Albion, Ill., had occasion to use a live *Unio* in illustrating some point in zoölogy. When the shell was opened there was found in the mantle quite a large, regularly-formed pearl, 12 mm. wide, and 7 mm. high. The pearl was found in the anterior side of left valve. There is quite a depression in the valve where the pearl was found, although it was not connected with the shell. The *Unio* from which the pearl was taken is *U. multiplicatus* Lea, and is a mature shell. It was found in the Bonpas Creek, not far from where it empties in the Big Wabash River.—C. S. HODGSON.

MR. SLOMON ROUS, whose stock of Cape shells is well known to many of our conchologists, has removed to 929 DeKalb Ave., Brooklyn, N. Y. He reports the receipt of large consignments of South African shells, including most of the recently described species.

NEW PUBLICATIONS RECEIVED.

CHECK LIST OF NORTH AMERICAN NAIADES, by B. H. Wright and Bryant Walker. 8vo, pp. 19, Detroit, 1902. An alphabetically arranged list of species with the genera and groups indicated, and the distribution briefly stated. It will prove useful for checking collections, as well as for determining the modern genera of collections labeled by Lea's system. It is based upon Simpson's Synopsis.

NECROLOGY.

A veteran conchologist, WILLIAM LEGRAND, of Tasmania, has just died, aged 82. He was a book-seller in Hobart, and printed (with his own hands) a little book, *Collections for a Monograph of Tasmanian Land Shells* (1871), which Tryon noticed in Volume III. of the *Manual of Conchology*. Much of the Tasmanian material described by Hanley was, I believe, obtained by him, and Tenison-Woods described many shells from his collection. Tate and May named a genus *Legrandina* after him. *Turris legrandi* Ten.-Wood; *Columbella legrandi* T.-W.; *Calliostoma legrandi* T.-W.; *Gibbula legrandi* Petterd; *Zidora legrandi* Tate, perpetuate his memory. His collection was purchased by C. E. Beddome.—C. HEDLEY, Sydney, N. S. Wales, July 9, 1902.

We regret to record the death of DR. J. G. COOPER, at Haywards, California, on July 19, at the age of 72 years. Extended notice will follow.

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No. 6.

HELIX VAR. CIRCUMCARINATA AND PYRAMIDULA ELRODI.

BY ROBT. E. C. STEARNS.

I have to thank Mrs. M. Burton Williamson of this city for the opportunity to examine a specimen of *Pyramidula elrodi* described by Dr. Pilsbry on pages 40-41 of THE NAUTILUS for August, 1900. As the example was sent to Mrs. Williamson by Professor Elrod there is no doubt as to its authenticity. The form is unquestionably the same as that described by me in the Annals of the N. Y. Acad. of Sciences, Volume I, November, 1879, as *Helix var. circumcarinata*,¹ Mrs. Williamson's specimen differing only in size, being .85 as compared with .92 and 1.01 of an inch, greater diameter, of my examples.

Several specimens of *circumcarinata* were given to me by the late A. W. Crawford, of Oakland, some before and some after my description was written. He had numerous examples, received from an acquaintance or friend, who gave "Turloch, in Stanislaus county, Cal.," as the locality where he had found them. Subsequently Mr. Crawford discovered he had been deceived and stated the true locality as being "near Columbia, in Tuolumne county." His friend may have been guilty of a second fib. As I noticed certain characters suggestive of possible relationship to the well-known *Epiphragmophora mormonum*, which occurs in the Tuolumne region, I have regarded the later habitat given by Mr. Crawford as quite probable.

¹See Binney's Manual of Am. Land-Shells, 1885, p. 141; also, Pilsbry's Catalogue, Phila., 1898, p. 4.

The general region in which Columbia is situated remains to be explored; it has been barely glanced at. Though the occurrence of *circumcarinata* thereabouts has not been verified by subsequent collectors, its non-occurrence there cannot safely be assumed upon the ground of extreme remoteness from the Montana region explored by Professor Elrod, when we have the more extraordinary fact in the matter of distribution, exhibited by the occurrence of *Pyramidula hemphilli* Newc. (heretofore credited to Arizona, Nevada, Idaho, Utah and Colorado), on Catalina Island, twenty-five miles distant from the mainland of southern California, where Mr. Hemphill, some months ago, collected numerous living examples, fifty or more, which he kindly showed me.

Here is a conundrum in geographical distribution, of great interest and certainly "a hard nut to crack."

Hemphill's original find of this peculiar form was in the White Pine mining district, extreme eastern Nevada.

A few years ago the distribution of *Vallonia pulchella*¹ was given as "Montana eastward, from Canada to, or nearly to the Gulf of Mexico. Europe." In September, 1900, it appeared suddenly upon my grounds in Los Angeles and continued to be abundant for some months; it is now scarce. Whence it came and whither it is going, who can tell?

Los Angeles, Cal., August 26, 1902.

"PYRAMIDULA" ELRODI AND EPIPHRAGMOPHORA CIRCUMCARINATA.

BY H. A. PILSBRY.

Dr. Stearns, having expressed the opinion that the two *Helices* named above are specifically identical, I have again compared them, and find my previous idea of their distinctness confirmed. My material consists of the types and numerous other specimens of *P. elrodi* and two specimens of *E. circumcarinata*, an adult and a young one, received from Dr. Stearns years ago, about the time the species was described. The difference between Dr. Stearns' views and my own, of the affinities of the two *Helices*, may be due to his

¹ See THE NAUTILUS for October, 1900.

having, perhaps, no examples of *circumcarinata* at hand for direct comparison with *elrodi*.

The following differences appear on comparing the shells: With the same general figure and size, *P. elrodi* has a wider umbilicus, and viewed from above, the last whorl is wider; the base is more convex, being swollen and almost subangular around the umbilicus; the rib sculpture is coarser; the finer spiral sculpture is much developed in *P. elrodi*, especially beneath, while *E. circumcarinata* shows no spirals there, but only minute papillæ scattered between the ribs. The shape of the apertures differs: In *P. elrodi* the transverse axis does not much exceed the longitudinal, while in *circumcarinata* it is conspicuously greater. In Dr. Stearns' species, the basal lip is narrowly reflexed, while in *P. elrodi* it is at most merely expanded a little. Finally, the apices show important differences.

In *E. circumcarinata* the first $1\frac{1}{2}$ whorls appear smooth, a high power showing a minute, even, criss-cross pebbly sculpture, like that of *E. mormonum*, and the next whorl shows only very weak riblets, with papillæ between them; while in *P. elrodi* the strong riblets begin earlier, and there is no trace of the *mormonum* type of sculpture, even in young removed from the uterus of the mother.

These facts indicate, in my opinion, that the great general similarity between the two species in question is merely superficial, and probably the result of similar conditions acting upon organisms originally diverse, and indeed not closely related. *P. elrodi* belongs undoubtedly to the *P. strigosa* group; while, although its soft anatomy is unknown, *circumcarinata* will probably prove to belong where Dr. Stearns placed it, near *mormonum*, although with present knowledge it is in all probability distinct from that specifically. In other words, I think the two species belong to different genera.

It might be as well to say here that the *strigosa* group of snails is not correctly placed in *Pyramidula*. They do not belong in the *Endodontidæ* at all, but are *Helicidæ*, nearer *Sonorella* than any other group, but constituting a new genus which will be suitably defined in the near future.

In South Australia there is a group of snails called *Glyptorhagada*, some species of which resemble *P. elrodi* remarkably in form, sculpture and color. They belong, however, to a different sub-family of *Helicidæ*, and the resemblance, as in the case of *E. circumcarinata*, is a case of convergent evolution.

CONTRIBUTIONS TOWARDS THE KNOWLEDGE OF THE MOLLUSCA OF
MADAGASCAR.

BY C. F. ANCEY.

Helicarion (?) *Dautzenbergianum* Anc.

Testa imperforata, convexo-depressa, angulata, tenuis, pellucida, nitens, corneo-virens, supra angulum medianum fascia rubrofusca sat angusta circumdata, indistincte et obsolete lineis radiantibus subplicosa. Spira depresso-conoidea, subobtusa, convexa. Anfractus $4\frac{1}{2}$ celeriter crescentes, subconvexi, sutura distincta sed haud profunda; ultimus magnus, dilatatus, utrinque convexus, medio angulatus, basi subtumidus. Apertura ampla, distincte obliqua, extus angulata, lunato-oblonga, leviter supra convexo-producta, basi regulariter usque ad columellam arcuata, marginibus remotis.

Diam. maj. 18, min. $15\frac{1}{2}$, alt. $9\frac{1}{2}$, alt. apert. (oblique) 9 mill.

Hab.: "Montagne d' Ambre," N. Madagascar.

A very remarkable species on account of the keel and its very peculiar shape and coloration. It may, perhaps, be referable to *Euplecta* or *Hemiplecta*.

Euplecta oxyacme Anc.

Testa fragillima, subimperforata, conico-trochiformis, parum nitens, opacula, corneo-lutescens, concolor, sub valida lente lineis confertissimis incrementi notata et striis argutis permultis spiralibus decussata, subtus paulo nitidior. Spira elevata, perfecte conica, rectilinearis, acuta. Anfractus 6 regulariter crescentes, priores convexiusculi, inferi applanati, sutura lineari, appressa; ultimus acute et compresse in medio carinatus, infra convexus, supra carinam planodeclivis, antice haud deflexus. Apertura lunata, extus angulata, subobliqua, marginibus distantibus, supero recto-declivi, basali regulariter arcuato, columellari leviter supra perforationem parvulam expansiusculo, eam fere prorsus occultante.

Diam. maj. $13\frac{1}{4}$, min. $11\frac{3}{4}$, alt. apert. oblique $5\frac{3}{4}$, alt. $9\frac{1}{2}$ mill.

Hab.: Antankaratra Country (Humbly).

Of the same shape and size as *Rotula argentea*, Reeve, but of thinner texture and different color. It may belong to the same genus, but is perhaps related to *Euplecta* (?) *fenneriffensis*, Angas. The generic reference, therefore, is doubtful.

Hemiplecta oleata Anc.

Testa globoso-depressa, tenuis, anguste perforata, oleoso-nitens, supra tenuissime et irregulariter granulata; subtus magis nitida, lineis radiantibus incrementi notata et sub valida lente striolis spiralibus undulatis valde confertis cincta, superne fusca, ad peripheriam zonula pallida cingulata, infra peripheriam intense castanea, denique basi pallidior. Spira convexa, obtusa. Anfractus 5 convexiusculi, regulariter crescentes, sutura appressa nec profunda divisi, ultimus amplus, vix rotundato-angulatus, basi convexus. Apertura subobliqua, lunata, marginibus distantibus, callo nitido tenuique junctis, supero convexo-declivi, basali regulariter arcuato, columellari anguste in trianguli forma expanso, subincrassato. Peristoma acutum, rectum.

Diam. maj. 37, min. $30\frac{1}{2}$, alt. 23, alt. apert. oblique $17\frac{1}{2}$ mill.

Hab.: Antsianaka Country (E. Perrot).

Very distinct from *Hemiplecta Balstoni*, Angas, *H. Cleamesi*, E. A. Smith, and *H. formosa*, Anc., all also from Madagascar.

Hemiplecta profuga Anc.

Testa depressa vel subgloboso-depressa, tenuis, perforata, nitida, supra subsericea, luteo-cornea, infra angulum medianum zona fusca angustaque cingulata. Spira plus minusve convexa, conoideo-depressa, obtusa. Anfractus 5- $5\frac{1}{4}$ convexiusculi, regulariter crescentes, oblique obsoleteque lineis incrementi confertis vix sculpti, supra passim et inconspicue subgranulati, sutura parum profunda discreti, ultimus ante medium angulo ad aperturam paulatim evanescente aut subrotundata cinctus, basi convexior. Apertura subobliqua, lunata, transverse irregulariter oblonga, extus subangulata, marginibus remotis, basali antice subsinuato, columellari in trianguli forma supra perforationem circularem et minutam anguste dilatato.

Diam. maj. 22, min. $18\frac{1}{2}$, alt. apert. oblique 8 mill.

Hab.: Antankaratra, N. Madagascar (Humblot).

This is allied to *H. oleata*, but is much smaller, more depressed and of lighter color. The sculpture also is more obsolete.

Macrochlamys granosculpta Anc.

Testa perforata (perforatio parva, sed aperta, circularis), tenuis depressa, oleoso-micans, sordide luteo-cornea, vix lineis incrementi notata, striis confertissimis spiralibus passim, sed ad suturam præsertim, granulosus decussata, apice lævi. Spira depresso-sub-

conoidea, obtusa. Anfractus $4\frac{1}{2}$ convexiusculi, regulariter crescentes, sutura appressa, superficiali; ultimus suprà convexiusculus, infrà convexior. Apertura subobliqua, lunata, sat ampla, transverse oblonga. Peristoma acutum, marginibus distantibus, columellari in trianguli forma everso.

Diam. maj. 15, min. 13, alt. $8\frac{1}{4}$, alt. apert. oblique $7\frac{1}{2}$ mill.

Hab.: Antankaratra Country, N. E. Madagascar (Humblot).

The two specimens I have seen of this species probably are young ones, altogether the species is quite distinct from any other from Madagascar on account of its peculiar sculpture.

Macrochlamys Humbloti Anc.

Testa anguste perforata, conoideo subdepressa, tenuis, nitidissima, fusco vel purpureo-cornea, zona pallida, albescente, dilutaque infra suturam ornata, sublœvigata, infrà lineis incrementi radiantibus obsolete notata et sub valida lente exiliter striis spiralibus incisula. Spira conoidea, subobtusa. Anfractus $5\frac{1}{2}$ regulariter et sat lente accrescentes, convexiusculi, sutura levi, appressa; ultimus suprà convexo-declivis, infrà convexus, subdepressus. Apertura parum obliqua, lunata, truncato-oblonga. Peristoma simplex, marginibus distantibus, columellari minute in trianguli forma expanso.

Diam. maj. $12\frac{1}{2}$, min. 12, alt. 8, alt. apert. oblique 6 mill.

Hab.: Antankaratra Country (Humblot).

Quite unlike the other species hitherto recorded from the island, the sutural white band being an unusual feature in the genus.

Helicophanta Alayeriana Anc.

Testa imperforata aut vix subrimata, depressa ovato-globosa, solidula, primum læte fulva et inconspicue griseo multifasciata, deinde in ultimo intense brunea et paulatim nigricans, ac præter zonam pallideorem initio ultimi anfractus suprà peripheriam concolor, epidermide nigra glutinosa decidua induta. Spira brevissima, convexa, obtusa, apice subplanata. Anfractus 4, celerrime accrescentes, convexiusculi, sutura impressa in ultimo sublacerata divisi; embryonales tenuiter oblique striati, penultimus granulis parvis et elongatis irregulariter asperatus, ultimus ab initio granulis destitutus, irregulariter plicatulus, maximus, inflato-depressus, ad aperturam superficialiter atque spiraliter submalleatus, basi convexus. Apertura perobliqua, diagonalis, late ovalis, sublunata, intus atro-cyanea, margaritacea, nitida. Peristoma incrassatum, expansum, basi breviter

reflexum, hepaticum, margine columellari crasso, albo, nitido, dilatato, medio late et indistincte subtuberculato, parietali albescente, callo nitido crassiusculo oblecto.

Diam. maj. $69\frac{1}{2}$, min. 52, alt. 41 mill.

Hab.: Bora County, S. Madagascar (Sikora).

This is a beautiful species, between *H. gloriosa* Pfeiffer and *H. Ibaroaensis* Angas, but nearer to the latter one. It is however smaller, more globose, the aperture is larger, of a more oblique shape and the columellar margin is thicker.

Ampelita Robillardi Angas.

This does not appear to be a very variable species. The shell is more or less depressed and the upper line is sometimes wanting.

Hab.: Fort-Dauphin, S. Madagascar (F. Sikora).

Ampelita Madagascariensis Lam.

Hab.: Fort Dauphin, S. Madagascar.

Ampelita gonostyla Anc., f. major.

Hab.: Bora Country, Madagascar (F. Sikora).

The specimen is larger and has a bluish lip, thicker than in the typical form.

Leucotænius ellipticus Anc.

Testa elliptico ovalis, glandiniformis, solida, alba, strigis subrectis fuscis nonnullis angustisque passim picta, subobliqua confertim costulata, costulis infra medium ultimi anfractus evanidis. Spira satis producta, regulariter conoideo-attenuata, obtusa. Anfractus $8\frac{1}{4}$ subplani, regulariter crescentes, sutura subirregulari propter costulas; ultimus oblongus, dorso convexo-attenuatus. Apertura subrecta, pyriformi-ovalis, superne angulata, lactea. Peristoma vix incrassatum, obtusiusculum, basi leviter effusum, ad columellam late dilatatum ac supra perforationum angustam reflexum, marginibus remotis, callo nitido junctis.

Long. 54, lat. $23\frac{1}{2}$, alt. apert. 25 mill.

Hab.: Andrahomana, S. Madagascar (Sikora).

I at first supposed this species might be *L. Favanni* Lam., var. β elongatula, of Crosse (Journ. de Conch., 1868, p. 185), also found in southern Madagascar, but the present form is quite different in shape, number of whorls and sculpture from the true *L. Favanni* Lam., the latter being similar in sculpture to the *Bulimulus dealba*

tus var. *Ragsdalei* Pilsbry. It is the fourth species recorded of the genus, the others being:

L. Favanni Lam.

L. crassilabris Gray.

L. Procteri G. B. Sowerby.

The latter is much like a dwarfed example of *Favanni*, but is shorter and more conic.

Clavator Balstoni Angas.

Hab.: Imerina (F. Sikora); also Antankaratra Country (Humblot)..

The specimen of Imerina is shorter and more ventricose than others I have seen.

Clavator Balstoni Angas, var.? *herculea* Anc.

Testa *eximie* magnitudinis; differt a *Cl. Balstoni* Angas, non solum statura insigni sed etiam spira magis producta, anfractibus 9 (nec 8), testa magis elongata, paulo solidiore, apertura magis incrassata, margine columellari longiore, crasso, summo subacuto.

Long. 144, diam. $45\frac{1}{2}$, alt. apert. 48 mill.

Hab.: N. W. Madagascar (Humblot)..

Owing to the variability of the species, I dare not separate this very large and remarkable specimen from *Cl. Balstoni*, which is looked upon by some conchologists as a synonym of *Cl. eximius* Shutt., but considered as distinct by Crosse & Fischer; altogether it might prove to be a different species.

(*To be concluded*).

LIST OF LAND MOLLUSCA FROM THE NEIGHBORHOOD OF SAPPORO, YESSO.

BY HENRY A. PILSBRY AND ADDISON GULICK.

A number of land shells collected by Mr. Paul Rowland at and near Sapporo, in Ishikari province, Yesso, and submitted to us for study, adds to our scanty knowledge of the Hokkaido species.

Eulota (*Euhadra*) *pelionphala* var. *septentrionalis* (Ehrm.). Mt. Moiwa, two miles from Sapporo, and Maruyama, $1\frac{1}{2}$ miles from the same place. Specimens from the former place are typical in color, having two broad dark bands and an umbilical patch. At the second locality two of three shells have a narrow band above the upper wide one, and the third has opaque creamy streaks, interrupting the

bands, as in ordinary *pelionophala*. All have the characteristic dark apex.

Eulota (Euhadra) blakeana (Newc.). Mt. Moiwa.

Eulota (Mastigeulota) gainesi Pils. Maruyama.

Eulota (Mastigeulota) gainesi var. *gudeana* Pils. Sapporo Park.

Clausilia micropeas var. *hokkaidoensis* Pils. Mt. Moiwa.

Clausilia rowlandi n. sp. Garukawa, 10 miles from Sapporo.

This is a very distinct new species of *Euphædusa*, named in honor of Mr. Paul Rowland.

Cochlicopa lubrica (Müll.). Garukawa.

Pyramidula pauper (Gld.) Yubari, 50 miles from Sapporo.

Kaliella sp. Mt. Moiwa. A large species, identical with Mr. Hirase's no. 678.

Succinea lauta Gld. Maruyama.

Helicina hakodadiensis Hartm. Mt. Moiwa.

The *Kaliella* is one which has been the subject of some correspondence between one of us and Mr. G. K. Gude, and there seems to be no doubt that it is an undescribed form. The new *Clausilia* will be described and illustrated in "Additions to the Japanese Land-snail Fauna," No. 7. The range of *Helicina*, *Eulota pel. septentrionalis* and *Clausilia* is extended some distance northward by Mr. Rowland's collection.

UNIO POPEII, LEA, IN NEW MEXICO.

BY T. D. A. COCKERELL.

In the list of New Mexico mollusca the genus *Unio* has not appeared, but I always hoped that some species would turn up in the eastern portion of the Territory. When recently at Roswell, in the Pecos Valley, Miss Bessie Peacock, of that town, brought me some single valves of a *Unio* which she had found in North Spring river, Roswell. I was, of course, greatly interested; and next day, guided by Miss Peacock, visited the place and had the good fortune to find a complete specimen. The shells are fresh and the species is evidently still living in the river.

I sent the specimen I had found to Mr. C. T. Simpson, who kindly reports as follows: "This is *Unio popeii*, Lea, and it is quite a long way out of its known range. The type came from the Rio Salado, a tributary of the Rio Grande, and since that was found other speci-

mens have been taken in Southwestern Texas. A few years ago Dr. Edgar A. Mearns collected it abundantly near Ft. Clark, Southwestern Texas, and obtained a number of living specimens, which he sent to me. Some of these were gravid and showed it to be a true *Unio*."

A NEW VARIETY OF GLYPTOSTOMA NEWBERRYANUM.

BY F. W. BRYANT.

G. newberryanum var. *depressum*.

This variety differs from typical *Glyptostoma newberryanum* (W. G. Binney) in being very much depressed, the altitude of shells with an equal number of whorls being less than two-thirds that of Binney's species. The diameter is correspondingly reduced. The aperture is also less round than in *G. newberryanum*. A specimen measures, alt. 11, diam. 27 mm.

Dead shells of this variety are found in abundance on the bluff's north of Ensenada, Lower California.

It has also been collected by Mr. Henry Hemphill near Wilmington, Los Angeles Co., California.

THE MANUFACTURE OF PEARL BUTTONS FROM FRESH-WATER MUSSELS.

In the manufacture of pearl buttons the centre of activity has shifted from the China Sea to the river towns of the Mississippi. Altogether unknown in this region a dozen years ago, this industry has grown to such proportions that it now employs the services of thousands of people, and the output has become so great that it materially affects the button market of the world.

About twelve years ago a German buttonmaker named Boeple wandered into Muscatine from the old country. He saw for the first time the mussel shells of the Mississippi river. He examined them closely and expressed the opinion that they were good material for buttons. Up to this time fresh-water shells were considered unsuitable for any such use, and authorities on the subject were naturally skeptical in regard to Boeple's opinion of their usefulness. He persisted in claiming that the "niggerhead" mussel from the waters of the Mississippi river would make, if properly handled and finished, the finest pearl buttons yet produced. He took some

specimens to the factories at Waterbury, Conn., and after considerable experimenting one concern there determined that with some changes in their machinery the shell of the strange mussel from the "Father of Waters" would make a button to compete with the best of those from other parts of the world.

First one concern and then another began to use the Mississippi shell, until the foreign one was almost abandoned. In the beginning the shells were shipped east in the rough and prepared for use after their arrival there, but the freight rates were so high that one enterprising firm soon shipped that part of its machinery which makes the "blanks" out to Muscatine, and, what generally results when some pioneer leads the way to a good thing, others soon profited by the example and came also. The industry has spread both up and down the river, until almost every town of any importance, from St. Paul, Minn., to Alton, Ill., is now engaged in some form of the industry.

The manner of catching the mussels is interesting. A fisherman equips himself with what is known to the clan as a "John boat." This is a flatboat on the order of a scow, about 20 feet long and $3\frac{1}{2}$ feet wide. Upon the inside of the boat are placed eight uprights, which are between three and four feet high and have crotched tops. Four of the uprights are placed on each side of the boat, at just enough distance apart to accommodate the four 10-foot pieces of inch gaspipe that rest upon them. To each of the gaspipes are attached 20 four-foot stagons, similar to those used on an ordinary trout line, and each stagon has four hooks, with four prongs.

The fisherman goes out in his "John boat" with as much confidence as if it were the finest craft afloat. Once in the stream, he casts his gas-pipes, one by one. As the hooks drag along the bottom of the river they come in contact with the open shells of the mussels, which immediately close up on them. Thus attached, they are brought to the surface and taken off. The distance the hooks are dragged each time depends altogether on the thickness of the bed, and varies from three boat-lengths to an eighth of a mile.

The rivers of Arkansas are said to be so thick with mussel beds that they crop out of the water when it is low. The men put on rubber boots and shovel the shells into the boats. In the Upper Mississippi district, shells are quoted in car-lots, ranging from 15 to 30 tons in weight, but the Arkansas dealers have astounded everybody in the business by sending out quotations on 500-ton lots and

promptly filling all orders sent them. The men sell the mussels to the button factory operators at so much per 100 pounds. The wages they make depend upon their diligence and the luck they meet with in getting in a thick bed, but range from \$1.50 to \$5 per day. There is one big mussel bed near Canton, Mo., about eight miles in length.

The process of making the shells into buttons is interesting. The shells are first cut up into blanks the exact size the buttons are to be; then they go to the grinder, a machine which grinds the black back off of them; after that to the facing machine, which cuts the face on them; next to the backer, which bevels the back; then the drill, which puts in the eye-holes; from here they go to the polishing room, where the glossy finish is put upon them; after that they are sorted, put on cards and boxed up.

There are about 40 factories in Muscatine, and the amount paid out weekly in wages is \$10,000. There are factories in Davenport, Fort Madison, Burlington, Quincy, LaGrange, Canton and many other points.

There is an added interest in the business of mussel fishing on account of the likelihood of finding pearls. It is not an uncommon thing for a fisherman to find a pearl valued at \$100, and one lucky fellow found a beauty which sold for \$5,000. Every follower of the business has a little bottle filled with specimens, which eventually find their way to the market.—*Phila. Record*.

GENERAL NOTES.

CANTHARIDUS PERONII Phil. In this journal for May, 1901 (xv, p. 8), I noted that it was Perry who first gave a name to this species, *Bulinus carinatus*. I find that this name cannot stand on account of the earlier *Bulinus carinatus* of Bruguiere, and the name given by Philippi will be retained. In the same note, the second *i* was omitted from the name *Bulinus eximius* Perry, by typographical error.—*H. A. Pilsbry*.

ANGITREMA VERRUCOSA AT LAWRENCEBURG, INDIANA.—I am able to list an entire new shell to this locality, *Angitrema verrucosa* Raf. This shell had so far never been found in the upper Ohio, the mouth of the Wabash, 275 miles below this point, being its locality according to Say. I was fortunate enough to obtain 60 specimens of this shell, and send you a set for the collection.—*A. C. Billups*.



DR. JAMES G. COOPER.

THE NAUTILUS.

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No. 7.

DR. JAMES G. COOPER.

On the nineteenth of July, Dr. Cooper, a man prominent in the scientific history of Western America, died at his home in Haywards, California. For nearly fifty years he labored with zeal and earnestness for the advancement of zoölogical knowledge. Trained as a physician and for years engaged in the practice of his profession, he yet found time for work of lasting value in the domain of nature-study. He suffered from ill health for many years, yet as one of the pioneers in the western field, his name will be held in grateful remembrance for what he has done in zoölogical science.

His father, William Cooper, one of the founders of the Lyceum of Natural History, now the New York Academy of Sciences, was eminent as a naturalist. From him Dr. Cooper received the early training which in large measure prepared him for his later career. Born in New York, June 19, 1830, James commenced his school life at the age of ten years, while living with his family on a farm near Hoboken, N. J. On his way to school it was his delight to collect birds or shells or anything else in animate nature which he might find, thus showing those traits which were afterward a dominating factor in his life work. Later he studied medicine, and received his degree from the College of Physicians and Surgeons of New York in 1851. After two years spent in the city hospitals, he was appointed physician on a government survey for a railroad between St. Paul and Puget Sound. A part of his duty was to make zoölogical and botanical collections, and in this way he began the observations and discoveries for which the scientific world is permanently indebted to him. During the succeeding years he spent most of his time in col-

lecting on the Pacific coast. In 1855, after the abandonment of the survey, he was at Gray's Harbor, then at Whitby's Island, then for six weeks in the Santa Clara Valley, in California, after which he went to Panama to collect shells for his father, who wrote the article on West Coast Shells for the Pacific R. R. Reports. Until 1860, Dr. Cooper continued his field work on the Pacific coast, much of the time at his own expense. In that year he was appointed Zoölogist of the California State Geological Survey under Whitney. While engaged in this work, he collected along the coast from San Diego to Bolinas, as well as inland. His observations on the land birds were embodied in the report on Ornithology, edited by Professor Baird and justly regarded as "by far the most valuable contribution to the biography of American birds that has appeared since the time of Audubon." (Baird.) Dr. Cooper's report on Conchology still remains in manuscript form in the library of the University of California. This report contains information of the highest value, especially in its voluminous notes on geographical distribution.

Through the latter part of the Civil War, Dr. Cooper served as surgeon in the Second Cavalry, California Volunteers. In 1866, at Oakland, California, he married Miss Rosa M. Wells. His later life was spent in the practice of his profession, until, with failing health, he retired to Ventura county, then in 1875 to Haywards. Although no longer as active in collecting as in earlier years, his scientific work was continued with the ripe experience and knowledge of zoölogy which the years had brought him. Some of his later work was done for the State Mining Bureau in the identification of fossils, in the description of new species, and in the publication of a Catalogue of Californian Fossils. For the Academy of Sciences also, of which he was an early member and at one time vice-president, he performed valuable service, both in conchology and in palæontology. Some of his latest papers were based on material collected by members of the Academy.

Dr. Cooper published more than forty papers on conchology between 1859 and 1896. His discoveries of new species and varieties of mollusks were numerous. Of the 116 new forms credited to him, 65 were described by Dr. Philip P. Carpenter, 16 by W. M. Gabb, 17 by Dr. Cooper himself, and the remainder by William Cooper, Gould, Bland, Newcomb and Tryon. It is noticeable that so few were described by Dr. Cooper. Owing to a lack of scientific books

and authenticated collections in California, he sent most of his new species to more favored workers for description. Dr. Carpenter says of the species collected by Dr. Cooper: "The diagnoses . . . published in the Proc. Cal. Ac. N. S. . . . should be credited to the zealous zoölogist of the survey, rather than to the mere artist-in-words who endeavors to represent their forms to the reader." Dr. Cooper described a few species collected by other workers in the field, but of these there is no enumeration at hand.

Dr. Cooper was a man of noble character and kindly disposition. He was tall and slender, not very fluent in conversation unless the topic under discussion was one of special interest to him. Many of the younger students of zoölogy in California remember with gratitude his aid so freely given them in their studies. Since his death, besides extended notices in the daily papers, there have appeared a memorial by Wm. H. Dall in Science for August 15, and one by W. O. Emerson, together with a list of ornithological papers, in the current number of the Condor. The last is the Bulletin of the Cooper Ornithological Club and contained in its first issue, 1899, a much longer account of Dr. Cooper's life work. A partial list of his conchological papers will be found in Bulletin 4, California State Mining Bureau. The present portrait is from a photograph taken in 1865, and was sent to the writer by Mrs. Cooper, who still lives in Haywards.

WILLIAM J. RAYMOND.

University of California, Oct. 15, 1902.

NOTICES OF NEW JAPANESE LAND SNAILS.

BY H. A. PILSBRY AND Y. HIRASE.

Mr. Nakada, who collected so successfully in the Bonin Is. (Ogasawara-jima), has now gone into western Hondu, through the provinces Echizen and Kaga, and continuing northward will collect in Noto and Sado Island. Among many other interesting discoveries, he has found *Sphyradium edentulum* Drap. (new to eastern Asia), *Bifidaria plicidens* Bs. (described from India), magnificent specimens of *Eulota (Euhadra) senckenbergiana*, one of the finest helices in the world, and many other beautiful shells.

Chloritis albolabris Pilsbry & Hirase, n. sp.

Shell depressed, the alt. about half the diameter, but slightly convex above, several earlier whorls being coiled in a plane, the tip of the apex turning down; umbilicate, the width of umbilicus about one-fifth that of the shell, thin but moderately strong, greenish, somewhat russet tinted above. Surface dull, marked with low growth-wrinkles, and set with *rigid, short, black-brown, tapering bristles*, arranged in oblique lines as usual, but in part irregularly placed. On the latter part of the last whorl the bristles stand nearly a half mm. apart. Whorls $4\frac{3}{4}$, convex, slowly widening to the last, which is fully double the width of the preceding whorl, is well rounded at the periphery and beneath, and descends slowly in front. Suture deeply impressed. Aperture quite oblique, widely lunate, the peristome white, narrowly reflexed, thickened with a narrow rim within, the ends approaching.

Alt. 9.6, diam. 20 mm.

Alt. 9, diam. 18 mm.

Yaku-shima, Osumi. Types no. 88883 A. N. S. P., from no. 958 of Mr. Hirase's collection.

This fine *Chloritis* needs comparison with no other Japanese species. The wide umbilicus, stiff, dark-colored bristles, and thick white lip, are conspicuous features differentiating it from other forms. (*Albolabris*, white-lipped.)

Eulota (Aegista) kobensis var. *gotoensis* P. & H., n. var.

Much smaller than *kobensis*, with narrower umbilicus; whorls $5\frac{1}{2}$; sculpture and color as in *kobensis*. Aperture more nearly circular, the lip thick and white, as in *kobensis*. Alt. 6.5, diam. 12 mm.

Goto, Hizen. Type no. 88877 A. N. S. P., from no. 969 of Mr. Hirase's collection.

E. kobensis (Schm. & Bttg.) has hitherto been known from Awaji, Setsu and Yamashiro, adjacent provinces, though the former is insular. The occurrence of a race far to the southwest is therefore interesting.

Eulota (Plectotropis) omiensis var. *echizenensis* P. & H., n. var.

Shell depressed, conic or low-conic above, convex beneath, umbilicate, the width of the umbilicus one-third the diameter of the shell; brown; surface nearly lusterless, sculptured with slight and

irregular growth-lines and bearing sparse triangular cuticular processes, nearly wanting in some individuals. Whorls 5 to $5\frac{1}{3}$, convex, the last angular at the periphery, the angle disappearing behind the outer lip, slowly descending below the angle of the preceding whorl. Aperture very oblique, rounded, about one-fourth of the circle excised by the preceding whorl. Peristome thin, expanded. °

Alt. 4.5, diam. 7.3 mm.

Alt. 5, diam. 7 mm.

Arato, Echizen. Types no. 83879 A. N. S. P., from no. 752a of Mr. Hirase's collection.

This western race is distinguished from *omiensis* by its more conic, elevated spire, and sparser cuticular shreds.

Eulota (Aegista?) intonsa Pils. & Hirase, n. sp.

Shell depressed, somewhat lens-shaped, umbilicate, the umbilicus less than one-fourth the diam. of the shell; thin; light brown with some indistinct corneous streaks, and corneous around the umbilicus. Surface somewhat shining, rather roughly papillose-striate, the last whorl densely set with short, hair-like cuticular processes, in part rubbed off. Whorls 5 to $5\frac{1}{2}$, slowly widening, somewhat convex, the last whorl strongly angular at the periphery, much more convex below the angle than above, shortly descending in front. Aperture oblique, oval; peristome thin, the upper margin slightly expanded, outer and lower margins expanded and narrowly reflexed, the terminations converging, parietal wall covered with a thin varnish.

Alt. 6, diam. 12 mm.

Alt. 5.3, diam. 11.5 mm.

Suimura, Awa (Shikoku). Types no. 83378 A. N. S. P., from no. 960 of Mr. Hirase's collection.

A species with much the contour of *Plectotropis*, but more like *Aegista* in sculpture and texture, so that both of us are disposed to refer it to the latter group. It is quite unlike any Japanese species yet described. The aperture reminds one somewhat of *Trachia*. (*Intonsus*, unshaven).

Pyramidula conica Pils. & Hir., n. sp.

Shell umbilicate, conic, rather thin, dark purplish-brown, closely, finely and rather irregularly striate. Whorls $4\frac{1}{2}$, very convex, separated by a deep suture, the last rounded at the periphery and beneath.

Aperture oblique, rounded, about one-fourth of the circumference excised at the parietal wall by the preceding whorl; peristome simple and thin, the columellar margin a little dilated. Alt. 1.5, diam. 2.7 mm.

Suimura, Awa, Shikoku. Types no. 83884 A. N. S. P., from no. 961 of Mr. Hirase's collection.

This species is excessively similar to the common European *P. rupestris*, type of the genus *Pyramidula*. In fact, if found in the western Palearctic area, it probably would not be separated more than as a subspecies. However, the whorls are more tubular, especially the last one. The Chinese *Pyr. orphana* (Heude) is also closely related, but comparison with a specimen received from Père Heude shows it to be perceptibly rougher and with the last whorl more depressed.

The species of the typical group of *Pyramidula* differ from those of the more widely distributed section *Gonyodiscus* in wanting regular rib-striae. This is more constant than the degree of elevation, which varies widely in both groups. Some large forms, such as *Pyr. solitaria*, also want the ribbed sculpture. It has elsewhere been shown that the teeth and jaw of *P. rupestris* are like those of the ordinary discoidal species; so that Dr. von Moellendorff's hope that it will prove generically distinct does not seem likely to be realized.

Macrochlamys kagaensis Pils. & Hir., n. sp.

Shell very narrowly umbilicate, globose-depressed, thin, greenish-yellow. Surface very glossy and smooth, marked with faint growth-wrinkles, the inner whorl densely and finely engraved with spiral striae, which are obsolete or nearly so on the last whorl. Whorls $4\frac{1}{2}$, rather rapidly increasing, the last about double the width of the preceding, rounded peripherally, convex beneath, impressed at the axis. Suture shallow, edged by a fine white line. Aperture slightly oblique, wide lunate, the peristome thin and simple, slightly dilated at the axial insertion. Alt. 9.5, diam. 15 mm.

Hakusan, Kaga. Types no. 83881 A. N. S. P., from no. 974 of Mr. Hirase's collection.

A fine large species, allied to *M. dulcis* Pils., but much more globose. *M. perfragilis* Pils., from Oshima, is very similar in form, but has an even smaller umbilicus and more oblique aperture, besides wanting the incised, clear-cut spirals on the inner whorls.

Microcystina nuda P. & H., n. sp.

Shell minute, imperforate or nearly so, depressed, yellowish, glossy and smooth. Whorls 4, slowly increasing, the last indistinctly and obtusely subangular at the periphery, above the middle; impressed around the axis. Aperture lunate, subvertical, the lip simple, acute, dilated at the axis, the columellar margin a little thickened. Alt. 1.2, diam. 2.6 mm.

Hakusan, Kaga. Types no. 83880 A. N. S. P., from no. 973 of Mr. Hirase's collection.

Apparently related to the smaller *M. sinapidium*, both belonging to Reinhardt's group *Discoconulus*. (*nudus*, naked).

Kaliella kagaensis Pils. & Hir., n. sp.

Shell subperforate, low-trochiform, yellowish and glossy. Surface marked with faint growth-lines, the second whorl delicately and very minutely costellate; base showing some faint spirals. Whorls 5, somewhat convex, slowly increasing, the last angular at the periphery, convex below. Aperture lunate, oblique, the peristome simple and thin, columellar margin subvertical, narrowly expanded. Alt. 2.4, diam. 3.2 mm.

Hakusan, Kaga. Types no. 83882 A. N. S. P., from no. 971 of Mr. Hirase's collection.

A shell almost identical in contour with *K. okiana*, but smooth and glossy, and a little larger.

Kaliella gudei Pils. & Hir., n. sp.

Shell large for the genus, perforate, conic, thin, pale yellowish, somewhat translucent, smooth except for slight, irregular growth-lines. The outlines of the spire are slightly convex, nearly straight, last whorl with a narrow, thread-like peripheral keel, which ascends the spire and is visible as a narrow border above the suture. Whorls 6 to $6\frac{1}{2}$, quite convex, the last convex above and below the keel, slightly impressed around the perforation. Aperture truncate-lunar, the lip simple, columellar margin dilated, reflexed. Alt. 5, diam. 6.2 mm.

Kayabe, Ojima. Types no. 81922 A. N. S. P., from no. 678 of Mr. Hirase's collection. Also Hakodate, Ojima. Mt. Moiwa, two miles from Sapporo, Ishikari (Paul Rowland); all in Yesso.

This is the largest Japanese species, and one of the largest of the

genus. It is related to *K. (?) ceratodes* Gude, but that is a much smaller and smoother shell. *K. gudei* was at one time identified with *H. labilis* and with *H. pupula* of Gould, both described from Hakodate, but Mr. G. K. Gude directed attention to its distinctness from these species.

CONTRIBUTIONS TOWARDS THE KNOWLEDGE OF THE MOLLUSCA OF
MADAGASCAR.

BY C. F. ANCEY.

Clavator Johnsoni E. A. Smith.

Hab.: Central Madagascar (Humboldt).

Clavator obtusatus Gmelin.

Hab.: Fort Dauphin, S. Madagascar (F. Sikora). Also found at the northern end of the island (Alluaud).

Clavator Humbloti Anc.

Testa magna, imperforata, elongato-attenuata, solidula, epidermide fusco lutescente infra transverse et exiliter fusco multifasciata induta, sub epidermide alba, nitidula. Spira regulariter usque ad apicem attenuata, elongata, obtusa. Anfractus 9? (supremi fracti), regulariter crescentes, convexiusculi, sutura mediocri in ultimis minute et leviter subcrenulata discreti, longitudinaliter striis confertis incrementi exarati, in 5 inferis lineis spiralibus impressis magis distantibus decussati; ultimus elongatus, inferne attenuatus. Apertura subobliqua, basi leviter recedens, irregulariter oblongo-attenuata, superne angulata, basi ampliata, intus cœrulescens. Columella antice angulatum producta, intus contorto-subplicata, crassiuscula. Peristoma obtusum, supra columellam dilatatum et adnatum, marginibus distantibus, callo nitido basi præcipue conspicuo junctis.

Long. 95, diam. $27\frac{1}{2}$, alt. apert. 31 mill.

Hab.: Antankaratra Country (Humboldt).

This fine species appears to be allied to *Cl. Moreleti* Desh., but is much larger and is very distinct.

Pachnodus rufoniger Reeve.

Hab.: "Montagne d'Ambre," Diego Suarez; Antankaratra (Humboldt).

Planorbis Madagascariensis E. A. Smith.

Hab.: Vinaninony and Fenoarivo.

Planorbis trivialis Morelet.

Hab.: Same localities.

Acroptychia æquivoca Pfeiffer.

Hab.: Antankaratra (Humblot).

I think that *A. manicata*, Cr. and F. is the same as this.

Hainesia crocea Sowerby.

Hab.: Andrahomana, S. Madagascar (Sikora).

I do not see that any precise locality was ever given for this species, erroneously ascribed to Mauritius by Benson.

Cyclostoma carnicolor Anc.

Testa pro genere mediocriter sed profunde umbilicata, globoso-conica, solida, suprâ parùm, inferne magis nitida, superne spiraliter multisulcata, præterea lineis incrementi sub lente decussata, carnea vel rubella, ad apicem luteola, fascia fuseo-cærulea infrâ peripheriam cincta. Spira conoidea, apice sat minuto, obtuso. Anfractus $5\frac{1}{2}$ convexo-rotundati, ultimus bene rotundatus, subtus fasciam lævigatus, dein iterum circâ umbilicum et in umbilico ipso confertim concentrice liratus, antice breviter ascendens. Apertura albida, intus candida vel luteola, fascia transmeante. Peristoma expansum, marginibus approximatis, callo submarginato junctis, columellari dilatato-reflexo. Operculum testaceum, sordide album, anfractibus 4, nucleo subcentrali.

Diam. maj. $23\frac{1}{2}$ – $26\frac{1}{2}$, min. 18–20, alt. 21–26 mill.

Hab.: Andrahomana (Sikora).

Nearly related to *C. asperum*, Pot. and Mich., but much less rugose and of different color. It may be the southern analogue of *asperum*, which lives in the northern end of Madagascar.

Cyclostoma Alayerianum Anc.

Testa globoso-turbinata, pro genere anguste umbilicata, parùm crassa, spiraliter confertim acutique lirata, liris in ipso umbilico conspicuis, infrâ peripheriam ultimi anfractus lævioribus, ochraceo-fulvescem, fasciis angustis 2 fuscis, quarum una angulo superiore aperturæ incipit, altera minus conspicua suprâ peripheriam ultimi cingulata. Spira turbinata, apice lævi, obtusulo. Anfractus 5 valde convexi, sutura profunda, inferne minute plicatula, ultimus

rotundatus, ad finem brevissime et leviter subascendens. Apertura parùm obliqua, subcircularis, intùs luteola. Peristoma subinterruptum, anguste, ad columellam paulo magis expansiusculum.

Diam. $9\frac{1}{4}$, alt. $9\frac{1}{2}$, alt. apert. vix 5 mill.

Hab.: Region of Fort Dauphin, S. Madagascar (F. Sikora).

Although this small species bears some resemblance with others, like *C. undatoliratum* Boettg., etc., still I cannot identify it with any of them.

Cyclostoma obsoletum Lam.

Hab.: Province of Boeni.

Cyclostoma filostriatum Sowerby.

Hab.: Fort Dauphin (F. Sikora).

About the geographical distribution, it may be of interest to note that *Helicophanta magnifica* has been found in Imerina, where it is said to be very scarce (Sikora), and *Helicophanta cornu-giganteum*, Chemnitz, in southern Madagascar, near Fort Dauphin (Sikora).

NOTE ON NEOCORBICULA FISCHER.

BY W. H. DALL.

In a small collection of freshwater shells from Uruguay, recently received, are specimens of *Corbicula obsoleta* Deshayes and *C. limosa* Maton. The latter is the *C. variegata* Orbigny, and the type of Fischer's section *Neocorbicula*, proposed for the American Corbiculas, which have separate siphons and a small pallial sinus, while the European types of the genus *Corbicula* have an unsinuated pallial line.

Several of the specimens above mentioned had the animal matter dried up within the shell, and in removing this it was discovered that the shells contained a large number of nepionic young of varied size, some nearly two millimeters in length and already showing radiating lines of color. There were 15 to 20 of the young fry in each individual, and while the dried matter gave no distinct indication of the original arrangement, the fry in each case were in the umbonal cavities.

I have run over the literature and manuals and have not found any reference to viviparity in *Corbicula* or *Cyrena*, though of course it is well known in the allied *Sphærium* and *Pisidium*. If it is a characteristic of the Old World *Corbiculas*, it is singular that it has not been hitherto noted.

The prodissoconch in these young shells is rounded, polished and translucent, and presents no remarkable peculiarities.

If the brooding of the nepionic young in a marsupial sac is a further point of distinction between the New and Old World forms, it is probable that it may be regarded as raising the value of the subdivision to higher than sectional rank.

"PYRAMIDULA" ELRODI AND EPIPHRAGMOPHORA CIRCUMCARINATA.

BY ROBERT E. C. STEARNS.

In connection with my remarks upon the above-named forms in the October number of THE NAUTILUS, and Dr. Pilsbry's comments that follow, he says: "The difference between Dr. Stearns' views and my own, of the affinities of the two *Helices*, may be due to his having, perhaps, no examples of *circumcarinata* at hand for direct comparison with *elrodi*." This suggestion is correct. I have not seen an example of *circumcarinata* for ten years, and only a single specimen of *Elrodi*, that heretofore referred to by me.

The dominant features of these shells are surprisingly alike. The many though less conspicuous characters indicated by Dr. Pilsbry in their bearing on the distinctive point, must therefore be accepted. The remarkable similarity exhibited between the forms in question are presumptively, as Dr. Pilsbry observes, the result of similar environmental conditions "acting upon organisms originally diverse, and indeed not closely related."

Closeness of relationship or otherwise, among land-snails inhabiting the same geographic or physiographic area, though the area may include a broad extent of territory, is another and very interesting question.

Regarding the relations of the *strigosa* group of snails, I have for a long time held the opinion that it was decidedly out of place in

Pyramidula, and am pleased to learn on the authority of Dr. Pilsbry that the proper position of this large and varied group will soon be made known.

Los Angeles, Cal., October 12, 1902.

GENERAL NOTES.

“SLUGS” AS MEDICINE.—While in Port Antonio, Jamaica, last March, I collected some *Veronicella sloanei* Cuv., and having nothing to put them in, wrapped them in paper and left them on a table in my room at the hotel. During my absence they escaped and began crawling around, much to the disgust of the colored chambermaid who happened in about that time. On my return she filed a vigorous protest against the “nawsty things,” and wanted to know what I intended to do with them. She then informed me that they were good for all forms of lung trouble and asthma. They are used as follows: Take a green cocoanut, cut off the end, and drop a good sized “slug” into the milk, in which it will dissolve. The milk is then drunk and is a “sure cure for asthma.”

It would be interesting to know whether this is a survival of the old European belief in the efficacy of the slime of “slugs” in pulmonary troubles, carried to the island by the early English settlers, or whether it is a part of the African pharmacopœia introduced with the slaves.—GEO. H. CLAPP.

NOTES ON *HALIOTIS RUFESCENS* SW.—For several months a company of Japanese fishermen has been engaged in collecting abalones on San Clemente Island, and drying the animals for the Japanese and Chinese markets.

Among the shells sent from this island to San Pedro for shipment I recognize quite a large number of fine *Haliotis rufescens* Sw., which is not, or is only very rarely found along the shore of the mainland of southern California at the present time.

Last year I collected an interesting series of this beautiful shell in the shell-mounds on San Nicolas Island, but most specimens of the shell in those mounds are broken or in an advanced stage of disintegration.

Recent collectors of abalones report living specimens of the red abalone very rare on San Nicolas Island.—HENRY HEMPHILL.

THE NAUTILUS.

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No. 8.

SURFACE SCULPTURE IN ANCYLUS.

BY BRYANT WALKER.

Owing to the simple character of the shell, which presents but few of the salient specific features which enable the more specialized groups to be readily determined, the North American *Ancylus*, like the Succineas, have received but scant attention from our collectors, and great confusion exists in regard to the identification of nearly all the described species.

The species of the earlier authors were based almost wholly upon the shape, contour of the slopes and position of the apex. The surface sculpture was as a rule overlooked. With the exception of the few species characterized by radial ribs or incised lines, in only four of the eastern American forms is the character of the surface mentioned at all in the original descriptions, and then only with reference to the growth lines.

Bourguignat, in 1853 (*Journal de Conchyliologie*, IV, p. 63), was the first to point out the apical scar as a peculiarity of the genus, and Pilsbry (NAUTILUS, IX, p. 139) is the only American author who has noticed its presence in any American species. It is present in all of them, but is much less conspicuous in those species which group around *A. fuscus* than in those of which *A. rivularis* is the leading form.

Pilsbry also was the first (*loc. cit.*) to call attention to the fact "that nearly all specimens are more or less coated with foreign matter, sometimes calcareous, but generally ferruginous (which) must be removed before the color and finer sculpture can be observed," and to give a practical method for cleaning the shells.

A recent study of the eastern North American species has developed some unexpected peculiarities in regard to their surface sculpture, which are of value in determining many of the species and which may prove to be of importance in reference to their phylogeny and classification.

In studying the *Ancylus*, it is necessary to have the shells thoroughly cleaned with dilute oxalic acid and to use a compound microscope of at least 50 diameters; not unfrequently a power of 100 diameters is required, especially with the smaller species, to reveal the characteristic sculpture. Under a simple lens of 10 diameters the shell, when cleaned, appears to be smooth and shining, but under a higher power a more or less developed system of sculpturing is visible in nearly every species. This consists of two elements: first the concentric lines of growth, and second, a radial sculpture more or less evident, which in its fullest development, as in *A. peninsulae* and *eugraptus*, presents a series of fine, conspicuous, radial riblets extending from the apex to the peritreme.

The concentric sculpture formed by the growth lines is not usually very strongly developed. It never presents the regular clear-cut striation such, for instance, as is presented by *Planorbis trivolvis*, but is irregular and more or less indented, varying in the different species.

The radial sculpture in all the species examined, when present, consists of fine transverse elevations varying from very fine, irregular, discontinuous ripples to continuous riblets covering the entire surface. When present at all, their position is radial.

The only species in which any other kind of radial sculpture has been noticed is the *A. borealis* Morse, in which the surface is marked "with fine, regularly interrupted radiating lines." It is not expressly stated that these are incised, but such would seem to be the inference. Unfortunately no authentic specimens have been accessible for examination.

There is a large degree of individual variation in the development of the radial sculpture, even in those species which have been established upon its presence and in which it is best developed. *A. peninsulae* is the only one in which it seems to be uniformly present. *A. filiosus* is frequently nearly smooth and, judging from specimens from both the Coosa and the Cahawba, the radiating sculpture is decidedly irregular. The same holds true in regard to *A. eugraptus*. *A. ovalis* has not been examined.

On the other hand, in nearly all the so-called smooth species there is a distinct tendency toward the formation of a minute, transverse, irregular and discontinuous rippling of the surface, which, especially on the lateral slopes, tends to form irregular riblets extending anteriorly. The median portion of the anterior slope is less apt to be affected in this way.

While it is, as yet, too soon to speak positively, it seems possible that an examination of a large amount of material may lead to discarding the presence of a well-developed radial sculpture, unaccompanied by other peculiarities of size and shape, as a ground for specific distinction. The *A. excentricus* Morelet may be cited as an example of this kind. It is described as smooth or with very fine concentric lines only, and apparently on this ground alone is distinguished from the *A. radiatus* Guilding. Bourguignat (J. de C., iv, p. 155), on other grounds, only allows it varietal rank; but Crosse & Fischer (Moll. Mex., ii, p. 37) hesitate to follow him on account of the absence of the radiating striæ, which are so prominent in *radiatus*. An examination of specimens of *A. excentricus* from Texas, collected by Singley, shows that in all of them the radiating sculpture is incipiently present and that in some there are well-developed riblets present on the antero-lateral slopes, the median portion of the anterior slope being practically smooth. (See also Pilsbry, NAUT., iii, p. 64.) A larger series would probably necessitate the uniting of the two forms.

The most striking feature, however, in the radial sculpture of the *Ancylis* is the presence, in many of the species, of a circle of fine riblets or striæ on the apex, radiating from the apical scar. These apparently have not been noticed before. When present in a species, they are invariably to be found, and that quite independent of the presence or absence of a radial sculpture over the entire surface, and they may be entirely wanting in species with a well-developed ribbed surface, as in *A. eugraptus*. When the radial sculpture is persistent over the whole surface, the riblets originate from these apical striæ, but when that sculpture is not present, they cease a very short distance from the apex. This apical sculpture is characteristic of the more elevated species with an acute apex, of which *A. rivularis* is the leading form. The scar in these species is situated on the tip of a sharp, prominent apex and, with its circle of radiating ribs, is very conspicuous and easily observed.

In a large number of species, however, the apex is smooth and the radial riblets when present originate below the apex. These are the wide, ovate or subcircular species, usually more or less depressed, of which *A. fuscus* may be considered the type. In these the apex is blunt and smooth and the apical scar is not conspicuous. In *A. peninsulae*, however, the riblets in some specimens seem to extend clear up to the scar, but not into it. While in this respect this species seems an exception to the rule, that the depressed species have the apical region smooth, nevertheless its affinities are all with that group, and in spite of the apparently intermediate character of its apical sculpture, it seems better to class it with them. A similar tendency, though much more feeble, has been observed in one set of *A. diaphanus*.

The eastern American species, so far as examined, fall into two natural groups characterized by their shape and contour as well as this difference in apical sculpture. Pilsbry has already indicated them (loc. cit.) on other grounds, and it is interesting to find that the distinction apparently also holds good on structural grounds of some importance.

The following list of eastern American species is arranged with reference to their apical character:

Apex striate.	Apex smooth.	Not examined.
<i>reticularis</i> .	<i>fuscus</i> .	<i>obscurus</i> .
<i>tardus</i> .	<i>diaphanus</i> .	<i>elator</i> .
<i>parallelus</i> .	<i>excentricus</i> .	<i>calcarius</i> .
<i>shimekii</i> .	<i>holdemani</i> .	<i>borealis</i> .
<i>filosus</i> .	<i>eugraptus</i> .	<i>ovalis</i> .
	<i>peninsulae</i> .	

Any collector, who has any of the unexamined species as here listed, will confer a favor by communicating with the writer.

A NEW HAITIEN CHONDROPOMA.

BY JOHN B. HENDERSON, JR., AND CHAS. T. SIMPSON.

Chondropoma superbum.

Shell having a small umbilicus, usually truncated, subsolid, somewhat shining; whorls 7, the two nuclear ones smooth and waxy; those remaining in the truncated shell 4; sculpture consisting of

rather fine axial threads, becoming finer behind the aperture; suture narrowly canaliculate, its lower edge finely denticulate; last whorl decidedly solute, free about one-fifth of its length; aperture almost regularly oval, vertical when viewed from its outer edge, oblique when viewed from the front; outer lip heavy, rounded and well reflexed; inner lip narrower, scarcely reflexed above; base within the umbilical region with faint spiral liræ; color brownish white, marked with brown spots arranged in longitudinal and revolving series.

Operculum paucispiral, finely ridged, calcareous without, horny within; nucleus excentric.

Length 25, greatest diameter 14, least diameter 11 mm. Length of aperture 10, diameter 7 mm.

Another shell. Length 21, greatest diameter 13, least diameter 7 mm. Length of aperture 9, diameter 6 mm.

Found on a high limestone hill back of Thomazeau, Haiti, many specimens, living and dead.

This species is somewhat closely related to *Chondropoma weinlandi* Pfeiffer, which is found on the plain about Thomazeau, but it is larger, solidier, more finely developed and painted, and has the last whorl much more solute and the outer lip more solid and reflexed. It varies a good deal in size and color pattern. There are occasionally faint longitudinal brown bands, and the darker spots which are usually longest in a spiral direction may become angular, rounded or almost blunted into axial rows.

It is a magnificent species, often quite as beautiful as *C. magnificum*.



SOME NOTES ON THE NORTH AMERICAN CALYCOLINÆ, WITH NEW SPECIES.

BY DR. V. STERKI.

The genus Calyculina has been pointed out by T. Prime¹ without a name, and named by Clessin.² It seems well-defined, since no species have been seen which were in doubt whether to be ranged under Sphærium or Calyculina.

¹ Mon. Corbiculidæ, 1865, p. iv.

² Mal. Bl. xix., 1870, p. 150, and used in "Cycladeen," p. 253.

One of the features, however, considered characteristic, and from which the generic name was derived, is not constant. The beaks are not always capped, or calyculate, and in *C. transversa*, e. g., they are simply rounded, as a rule, while in all other species, examples with rounded, not calyculate, beaks, are occasionally found, and sometimes at a large percentage. As stated elsewhere, it seems that this is caused, at least partly, by the seasons during which propagation is effected.

It has been asserted, and repeated, that the Calyculinæ have a cyclical period of life, within one year, depositing their young in spring. This seems not to hold good. Of *Cal. transversa* Say, e. g., I have collected specimens at all stages of growth, and also gravid animals in all seasons, also in midwinter, and nearly the same can be said of *C. partumeia*, *truncata* and *securis*. And among materials sent for examination from different places and collected at various seasons, the mussels were found of different ages and sizes.

Since the publications of T. Prime and Clessin, little has been said about our Calyculinæ. During the last eight years I had chances to examine many thousands of specimens, owing to the efforts and the kindness of a number of conchologists. Yet the materials extant are still insufficient, especially from the Southern and Western States. Most of the species seem to be rather variable, and some considerably so, in regard to size, shape, surface appearance and color, and some forms could be referred to certain species only after careful examination and often repeated comparison, and even then doubtfully in some instances. More materials from many localities are very desirable.

They preferably inhabit quiet waters, to which they are best adapted, with their thin and fragile shells. Pools, ponds, ditches, slow rivers and creeks often abound with them, where they are crawling among plants and dead leaves. In fast running streams, with coarse bottoms, they are scarce, and so along the shores of larger lakes.

So far as I know them now, the species are the following:

1. *C. elevata* Hald. A southern species, with comparatively strong shells. The specimens are not always so high and of such circular outlines as in T. Prime's figure. A rather small, but well inflated form from Kansas seems to range under this species.

2. *C. contracta* Pr. Seems to be a good species. Seen from

Alabama and Louisiana. Specimens from Kentucky (Bowling Green, collected by Miss Price) are slightly different in shape, being more rhomboid, but probably range with *contracta*.

3. *C. hodgsonii* n. Somewhat like *contracta*, but rather larger, somewhat more elongated; the shell is thicker, the nacre whitish, the hinge stronger; the posterior end is not so markedly or so obliquely truncated. The surface is rather dull, the color a vivid yellow, to plumbeous around the umbones, in older specimens. It has some resemblance with *C. transversa*, but is less elongated, more equipartite, the shell and hinge are stouter, the superior margin and the hinge more curved, especially so the posterior lateral teeth.

Size: long. 14, alt. 11. diam. 6.5 mill.

From a mill pond at Albion, Ill., collected years ago by Mr. C. S. Hodgson. It is in many collections under various names, *e. g.*, *Sphaerium aureum* Pr., from which it is very different. So well marked a form must be described and named, even if known from only one place, so far, and even if it should ultimately prove to be a variety, *e. g.*, of *C. contracta*, which, however, is not probable. I take pleasure in naming it after its discoverer, Mr. Hodgson.

4. *C. transversa* Say. Widely distributed and common in all kinds of waters. Fairly constant in shape, but rather variable as to size and color.

5. *C. ferrissii* n. sp. Shell elongated, equipartite, rather well inflated, beaks in the middle, narrow, moderately prominent, somewhat inclined forward, slightly or not calyculate; superior margin curved, sloping from the beaks anteriorly and posteriorly; scutum and scutellum slight but distinct, long and narrow; inferior margin well and regularly curved; anterior and posterior part rounded, without any angles, the former somewhat less high; surface with some irregular, not sharp, but partly rather deep striæ, more or less arranged in zones, polished; color plumbeous around the beaks, with broad light yellow zones along the margins; shell thin, hinge fine, plate quite narrow, teeth thin and slight, the laterals placed at angles with the longitudinal axis, rather long; ligament fine and very long.

Size: long. 13, alt. 10, diam. 7 mill.

Hab.: Oklahoma City, Oklahoma, Arkansas, Frierson, Louisiana; in the former States collected by Mr. Jas. H. Ferriss, in whose honor the species is named, in the latter by Mr. L. S. Frierson.

So far as known, the present Calyculina is decidedly distinct, and

moreover, was found in company with *C. transversa*, which it resembles in being so elongated. But its beaks are not anterior, narrower and less full, the hinge margin is not so straight, and the anterior and posterior ends are rounded, not truncate.

6. *C. partumeia* Say. Widely distributed and decidedly variable, some forms being hardly recognizable. At Garrettsville, Ohio, Mr. Streator has found a form with exceptionally broad, full, rounded beaks, quite unlike those of a Calyculina.

7. *C. jayensis* Pr. (*Sphaerium jayanum*, in Mon. Corb.). One of the rarer species, and known from Indiana and Michigan to Wisconsin and Iowa. Seems to be valid.

8. *C. truncata* Linsley. Rather common, and somewhat variable. In regard to shape and surface appearance, it usually resembles more *C. partumeia* than *securis*. Yet in some forms the posterior end is rather obliquely truncated, and the beaks are rather strongly inclined towards the anterior. The mussel is more inflated, as a rule, than the dimensions given in Prime's description.

Clessin (*Cycladeen*, p. 246) says: "It appears to me somewhat doubtful whether *C. truncata* can be regarded as a good species. Around the type of *Cal. securis* are grouped several species (*Sph. contractum*, *rosaceum*, *sphaericum*, *truncatum*, *lenticula*), which, according to European principles, would unhesitatingly be regarded as varieties." In all probability, Clessin had insufficient materials on hand.¹ *C. truncata* has been collected in many places over a wide territory, and has been found distinct. Quite commonly, I have found *C. securis* and *truncata* associated, and the two often also with *C. partumeia*. *C. contracta* is evidently of another type. As to *rosacea* and *sphaerica* we refer to the following.

9. *C. rosacea* Pr. There is a small Calyculina with a thin, transparent, horn-colored, or almost colorless shell, narrow, moderately high beaks, which is evidently distinct from the other species. It is known from different places in Michigan, Illinois, New York and Virginia. For years it has been a stumbling block, since most forms did not agree exactly with Prime's description of *rosacea*, and yet they could not well be ranged under any other species. After all, it seems that they are *rosacea*.

¹ As directly evident from some of his descriptions and notes. *E. g.*, he says in the description of *C. securis*: "shell shining," which is rather an exception than the rule. Some of his descriptions were made from single specimens, as he states.

10. *C. securis* Pr. Widely distributed, common, and quite variable in size, shape, surface sculpture and color. The shell is more or less inflated; the beaks are more or less prominent, broader or narrower, often not calyculate, but simply rounded; the posterior end is more or less truncate, the disproportion between the anterior and posterior parts various; the surface of the shell is usually dull or even rough from fine scales of the epiconch, but sometimes smooth or even glassy. The color varies from brown to a vivid yellow or orange (*crocea* Lewis).

11. *C. spherica* Anth. I have seen no authentic specimens and no Calyculinae from the original place, and consequently am unable to judge about it. It appears to be very near *securis*, also from some Michigan specimens received as *spherica*.

12. *C. rykolti* Normand. From Traverse City and from Straits Lake, Michigan, Mr. Bryant Walker has sent specimens of a Calyculina, which so closely resemble *C. rykolti* from Germany and Sweden that they can hardly be regarded as distinct. More materials may bring additional evidence.

Larger specimens (of the size given as typical by Clessin) from Saguache, Colorado, were in the collection of the late Dr. James Lewis, now in possession of Mr. Bryant Walker. The agree with *C. rykolti*, but must also be compared with the following:

13. *C. raymondi* Cooper. The specimens I have from Washington (Spokane, Mrs. Olney, and Seattle, Mr. Randolph), are evidently not mature. They have much resemblance with *C. rykolti*, and it would be of special interest to know whether such forms also inhabit eastern Asia.

14. *C. deformis* Carpenter. My specimens are from Rhode Island and New Jersey, not authentic but probably true. Whether this Calyculina is a good species, or a form of *securis*, as has been asserted, I am unable to decide, for the present. At any rate, it is a remarkable form, seems to be distinct.

15. *C. lacustris* Mull. (?). To Mrs. M. Olney I am indebted for a few specimens from the Spokane river, Washington, which can in no way be distinguished from *C. lacustris*, from several European countries. They appear absolutely identical. More specimens from other places would be very welcome.

Of *C. subtransversa* Pr., *lenticula* Gld., and *tenue* Pr., I have no materials. Under the first name, *C. transversa* from Texas have been sent out.

A NEW RISSOA FROM CALIFORNIA

BY W. H. DALL AND PAUL BARTSCH.

Rissoa kelseyi Dall and Bartsch.

Shell of medium size, elongate-conic, white, variously banded, or uniformly chocolate brown. Nuclear whorls mammillate, smooth. Post-nuclear whorls slightly rounded, ornamented axially by a few broad, depressed, almost obsolete ribs which are best seen near the summit of the whorls, and many irregular, more or less deeply impressed striations, which extended almost undiminished to the umbilical region. The spiral sculpture however is more conspicuous than the axial, and consists of deeply impressed lines which are more closely placed and less strongly developed near the summit of the whorls than at the periphery, grading gradually in this respect between these two regions. Sutures simple, well marked. Periphery and base of the last whorl well rounded, the latter ornamented by spiral sculpture similar to that between the sutures, but a little more distantly spaced and more strongly impressed. Eighteen of the spiral lines appear between the sutures upon the penult whorl and ten upon the base. Aperture large, oblique, decidedly effuse anteriorly; posterior angle acute, peristome continuous; columella strong, short, somewhat twisted and slightly revolute.

The type has seven post-nuclear whorls and measures: long. 6.3 mm., diam. 2.5 mm.

Seven specimens were sent to the National Museum by Mr. F. W. Kelsey, who collected them at Pacific Beach, California. The type and two specimens now form no. 168605 of the U. S. N. M. collection, the remaining four being in Mr. Kelsey's collection.

This species appears to be nearest related to *Rissoa albolirata* Carpenter, but is larger in every way than that form; there are also minor differences in sculpture.

VITREA DRAPARNALDI, BECK., IN WASHINGTON, D. C.

BY GEORGE W. H. SOELNER.

On the 22d of May, 1901, I visited a greenhouse in this city for the purpose of investigating its snail life, and was rewarded by finding a colony of what I at that time firmly believed to be finely de-

veloped specimens of *Vitrea cellaria*. A number of specimens were collected and labeled accordingly, and as many have since passed into the hands of friends, it may be well to state, in the interest of those who may not be familiar with the specific characters which differentiate this species from *V. draparnaldi*, that my identification of these shells was erroneous.

A recent search among the disintegrating ruins of an old mill in Georgetown, one of the oldest sections of the city, very unexpectedly brought to light specimens of a *Vitrea* which, notwithstanding its quite close resemblance to *draparnaldi*, is undoubtedly, I think, *cellaria*, although the shells obtained are unusually small and fragile, which is probably due to their out-of-door life. The largest measured only 8.75 mm. greater diameter. Owing to their smaller size and the different color of the animal and shell, I was at once impressed with the belief that I had found two species. A re-examination of specimens was, therefore, necessary, and after carefully comparing my first lot with Mr. Frank C. Baker's description and remarks on *V. draparnaldi*,¹ I was delighted to find that I had discovered this species; the specimens agreeing exceedingly well with his description in every detail. Dr. Pilsbry and Mr. Geo. H. Clapp, of Pittsburg, Pa., to whom I have sent examples, have kindly verified the identification.

Being anxious to know if the colony was flourishing, I again visited the nursery on November 3, 1902, and again secured a number of fine specimens, the largest measuring 16 mm. greater diameter.

This interesting find not only adds another species to the list of the mollusks of the District of Columbia, but another locality, and that a remote one, to the geographical distribution of this handsome introduced species, which seems to be gradually spreading over the United States. As far as I know, this is the first record for this shell east or southeast of Chicago, Illinois.

Washington, D. C., November 15, 1902.

NOTES AND NEWS.

NOTES ON LIMNÆA.—The receipt of Mr. F. C. Baker's very excellent work on the Mollusca of the Chicago Area suggests a few remarks on *Limnæa*. It seems unfortunate that American workers

¹ Mollusca of the Chicago Area, Part II; Chicago Academy of Sciences, April 25, 1902.

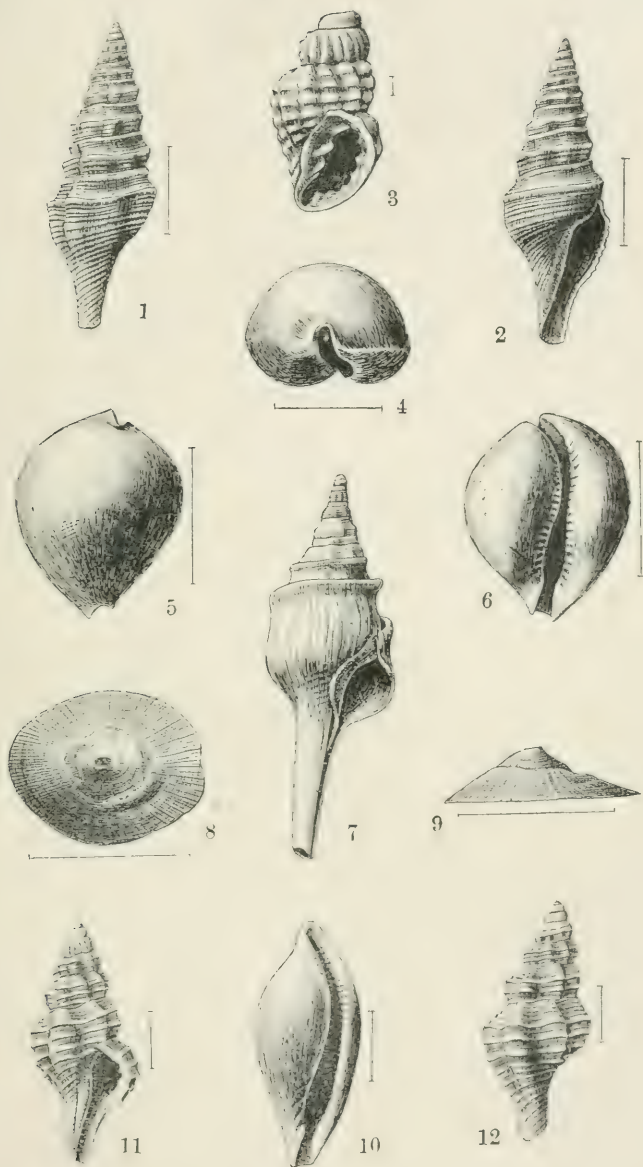
do not pay more attention to the European forms of the circumpolar types. Judging from the names, one would suppose that the American variations of *L. palustris*, etc., were quite different from those found in Europe. If this is the case, it is a fact of much interest; but it has never been demonstrated by comparisons, nor is it suggested by the figures in Mr. Baker's work. The variety *expansa* Hald., of *L. palustris*, is to be compared with the European var. *coniformis* Bourg., which on the face of things appears to be the same; while other American *palustris* seem referable to varieties *elongata* Moquin (Baker, Pl. xxxii, first three shells of fig. 1), and perhaps *conica* Jeffreys. In fact, it is not yet clear that there is any American variation of *L. palustris* which cannot be duplicated in Europe. With regard to *L. stagnalis*, it is well said that the typical European form is not that found in America, but it is apparently not true that the American form (*appressa* Say) is absent from Europe. I have seen plenty of European specimens which could not, I think, be distinguished from the American ones; such appear to pertain to the variety *fragilis* (Linné) and its allies. Some one should minutely examine the anatomy of these forms, to see whether it is not possible that there are two species, viz.: (1) *L. stagnalis* (L.), European; (2) *L. fragilis* (L.), Europe and America, including *appressa* Say, *raphidia* Bourgt., *vulgaris* Westerlund, etc.

Limnæa Woodruffi Baker, appears from the figures to be the European *L. peregrina*, in which case it must have been introduced.—T. D. A. COCKERELL.

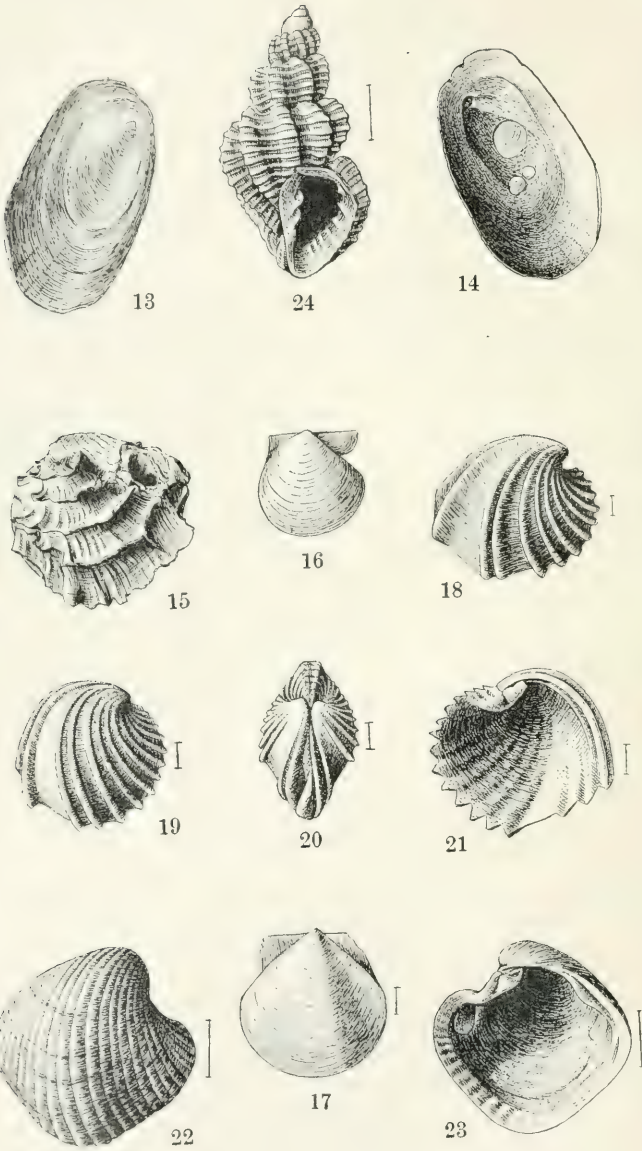
THE death is announced of the Jesuit Father Prof. P. HEUDE, on January 3d, at Zikavei, near Shanghai, at the age of 66 years.

At the NOVEMBER MEETING of the SECTION ON CONCHOLOGY, Brooklyn Institute of Arts and Sciences, Mr. S. C. Wheat exhibited two specimens of fresh-water mollusca taken from a stream in New Jersey, which, upon careful inspection by Dr. R. Ellsworth Call, were pronounced to be hybrids between *Margaritana marginata* and *Anodonta undulata*. The specimens aroused much interest, as such hybrids are very rare. A specimen of *Anodonta implicata* seven inches in length taken from Prospect Park Lake was also shown. These specimens were added to the collection in the Children's Museum.—F. H. AMES, Sec.

Description de mollusques nouveaux provenant de l'île Obi (Moluques). In Le Naturaliste, Nov., 1902, p. 247, Mr. Dautzenberg has described and figured a series of Helices and two Leptopomas. Of the former *H. (Albersia) omissa* seems to be identical with *H. (Albersia) obiensis* Mart. (Archiv f. Naturg. 1899, pl. 3). *H. (Papina) obiensis* Dautz. is apparently *H. (P.) piliscus* Mts. *H. (Papina) groulti* is a fine, pyramidal, carinate species of the *pileolus* group, somewhat similar to *P. rynchostoma* Pfr.—H. A. P.



ALDRICH: EOCENE MOLLUSCA.



ALDRICH: EOCENE MOLLUSCA.

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No. 9.

NEW SPECIES OF TERTIARY FOSSILS FROM ALABAMA, MISSISSIPPI AND FLORIDA.

BY T. H. ALDRICH.

The following species are principally Eocene; descriptions of two species have already appeared in *THE NAUTILUS* and they are now figured for the first time. One new species from the Oligocene of Oak Grove, Fla., has been added. The Oligocene deposit of Oak Grove has been pierced by a deep well near Mobile, Ala., and no doubt it will be found still further to the westward. I am indebted to C. W. Johnson, of the Wagner Free Institute of Science, Philadelphia. All the drawings have been executed by Dr. J. C. McConnell, of the Army Medical Museum, Washington, D. C.

PLEUROTOMA (DRILLIA) CASEYI n. sp. Pl. III, fig. 1, 2.

Shell fusiform, whorls ten to eleven, first four smooth, apex pointed, the balance of the whorls nodular with a connecting line situated at the periphery. About nine nodes on each whorl. The balance of the spiral sculpture consisting of close-set, rounded lines, which are stronger on the lower part of each whorl; suture nearly concealed by a strongly raised and rounded band which is wavy and closely appressed. On the humeral area the spiral lines are cut by fine curved lines formed by the former retral sinus, sinus nearly semi-circular. Canal open and slightly spatulate.

Length 11 mm., width 3 mm.

Localities: Red Bluff, Miss., Byrams Ferry, Pearl Rv., Miss., and Vicksburg, Miss.

Resembles *Drillia texanopsis* Harris, but is carinated at the periph-

ery, more strongly striated and with a deeper retral sinus. Maj. Thos. L. Casey, U. S. Engineers, has sent me examples from the upper part of the bluff at Vicksburg. The shell is named in his honor.

CANCELLARIA ANNOSA Aldr. Pl. III, fig. 3.

This species was described in THE NAUTILUS, Vol. XI, p. 97, January, 1898.

CYPRÆA NUCULOIDES n. sp. Pl. III, figs. 4, 5 and 6.

Shell broadly ovate, rounded, globose, extremities slightly produced, surface smooth, basal callus heavy and extending upwards about one-third on each side, base flattened, rounded into the aperture, resembling in this respect *C. pinguis* Con., but broader. Aperture rather narrow, denticulated.

Length 17 mm., greatest breadth 14 mm.

Localities: From the Claibornian at De Soto, Miss., McLeod's Mill, Miss., and Dubose's Mill, in West Alabama.

This species has a more flattened base than *C. spheroides* Con. and has a much heavier basal callus. The inner lip is smooth below the denticulations.

CLAVILITHES COLUMBARIS n. sp. Pl. III, fig. 7.

Shell fusiform, whorls ten, apex bulbiform, consisting of three whorls, the third constricted; the next four spirally striated and tuberculated, the last two strongly turreted and excavated below the sutural shoulder. Aperture small, constricted at posterior. Canal long, narrow.

Length of figured specimen 52 mm.

Localities: Claibornian of De Soto and McLeod's Mill, Miss., also in West Alabama, same horizon. This species approaches the form described by Harris as *Clavilithes humerosus* Con., var. *texasus*, but the size and extremely prominent shouldered whorls and the constriction below are peculiar. The figured example is the most perfect one obtained, but the shoulder is even more prominent in other specimens. On comparing this species with *C. longævus* Lamarck, I find it has one less embryonic whorl and a higher spire.

FISSURIDEA INFREQUENS, n. sp. Pl. III, figs. 8, 9.

Shell medium size, with broadly ovate periphery at base, rather depressed; substance of shell thin, foramen in anterior half, small and narrowly ovate.

Greatest breadth at base 22 mm., height 6 mm.

Locality : On the Chickasawhay River, three and one-half miles below Quitman, Miss., below the *O. sellæformis* bed, Claibornian.

This species differs from any Tertiary species known by the very thin shell in comparison with its size, and its very fine cancellation. The interior is filled with matrix.

OVULA SYMMETRICA n. sp. Pl. III, fig. 10.

Shell smooth exteriorly, spire produced, pointed and slightly spatulate, outer lip reflected, margined on the interior with numerous crenulations, and curved from spire to base. Aperture narrow, the inner margin of same denticulated near the spire and with three or four folds at base.

Length of figured example 9 mm.

Localities : McLeod's Mill and on the banks of the Chickasawhay River, three and a half miles below Quitman, Miss.; close to the Wautubbee beds of the Claibornian. This species differs from both *O. subtruncata* and *O. texana* of Johnson, and it has been kindly compared with the types by C. W. Johnson.

The specimen from the bluff below Quitman is broken, but if perfect would be about 13 mm. in length.

LATIRUS ELABORATUS n. sp. Pl. III, figs. 11, 12.

Shell small, whorls nine, the first three smooth, the fourth partly so, the balance nodular and crossed by spiral lines, the lines faint on the upper part of each whorl, becoming coarser below and developing plaits at the top of the transverse nodes; the younger whorls have two coarse spiral lines about their centre.

Suture irregular, closely appressed. Outer lip nodular within, the pillar lip smooth with the exception of two slight raised plaits about the centre of the aperture within; canal produced and but slightly curved.

Length of the largest specimen 11 mm., breadth $4\frac{1}{2}$ mm.

Localities : Matthew's Landing bed, at C. Jones, Wilcox Co., Ala., and in the Black Bluff clays near Grave Yard hill, Ala. The figures are of a small specimen and do not show the two plaits on the pillar lip because they are too far within the aperture.

ANOMIA NAVICELLOIDES Aldr. Pl. IV, figs. 13, 14.

For description see THE NAUTILUS, Vol. XI, p. 97, January, 1898.

CHAMA MONROENSIS n. sp. Pl. IV, fig. 15.

Shell of medium size, strongly rugosely plicated, lamellar. Upper valve with 6-8 leaves turned up to nearly a vertical at their ventral edges, each leaf covered with radial raised lines running in couples. Upper valve slightly convex, lower valve convex and inequilateral.

Resembles somewhat *C. corticosa* Con., but is smaller and more profusely ornamented. One lower valve has twelve leaves or corrugations. The upper valve is shown in the figure natural size.

Locality: The *O. sellæformis* bed, at White's Marl bed, Monroe Co., Alabama.

PECTEN (PSEUDAMUSIUM) SUBMINUTUS n. sp. Pl. IV, figs. 16, 17.

Shell minute, thin, surface smooth, not polished, valves rather flat, ears small, subequal in the right valve and unequal in the left. Fine rugose striæ on the ears of the right valve, vertical to the hinge line but not reaching it, but they run down over the submargin. One ear in the left valve with five or six radiating ribs, the other smooth; interior smooth, the cardinal margin cross striated.

Alt. 3 mm., lat. 3 mm. of the largest specimen.

Localities: Red Bluff, Miss., Jackson, Miss.

This little shell is evidently adult. It is probably found at Vicksburg also. It is not rare, closely resembles *Pecten Guppyi* Dall in form, but is smaller.

VERTICORDIA DALLIANA n. sp. Pl. IV, fig. 18.

Shell small, rather flat, surface ornamented with sharp curved ribs, in the present specimen thirteen in number, nine on the anterior, then a concave space as if one rib was missing, then two more ribs about the middle of the shell, then a wide concave space and then two more ribs, the last one almost at the margin. Ribs serrating the ventral margin. Cardinal tooth strong, erect; lateral tooth long and curved.

Breadth $2\frac{1}{2}$ mm., height from beak to base 2 mm.

Only one valve found; it is about the same size as *V. eocense* Langdon. The muscular scars are slightly impressed. Pallial line not perceptible.

VERTICORDIA SOTOENSIS n. sp. Pl. IV, figs. 19-21.

Shell small, strongly ribbed with twelve ribs, then a blank space, then two ribs near the margin, beaks blunt and rounded, ventral

margin serrated; lateral tooth long and curved. Interior very porcellaneous; muscular scars slightly impressed.

Localities: Claibornian of De Soto and McLeod's Mill, Miss., and also in West Alabama, same horizon.

This species closely resembles *V. dalliana* Nobis, but differs in the number of ribs and the absence of one space which appears on the other. It is also more rounded.

VERTICORDIA QUADRANGULARIS n. sp. Pl. IV, figs. 22, 23.

Shell stout, valves nearly quadrangular, rather thick and globose. Surface with numerous coarse, rounded ribs. Entirely covered with granulations; deeply excavated behind the beaks; possesses both cardinal and lateral teeth. Muscular scars are deeply impressed. Pallial line strongly marked. Internal basal margin showing the ribs.

Height and breadth equal, 7 mm.

Several valves were found. This species belongs to the Section *Haliris* Dall. The laterals are more strongly developed than in most forms of this section. It is distinct from *V. mississippiensis* Dall in having fewer and more rounded ribs and a more depressed lunular area.

CANCELLARIA BIFOLIATA n. sp. Pl. IV, fig. 24.

Shell small, whorls six, first two smooth, the third partially so, and the last three strongly cancellated. The ribs prominent, spiral lines alternately coarse and fine. Umbilicus open, pillar lip with two plaits. Shell appears to be turreted from the strong ribbing.

Length 7 mm., breadth 4 mm.

Locality: Oak Grove, Florida, Oligocene of Dall.

This little species differs from *C. mississippiensis* Con. in its less number of plaits on the pillar, its higher spire and open umbilicus.

A NEW CRASSATELLITES FROM BRAZIL.

BY WM. H. DALL.

Among some dead shells dredged by the U. S. Fish Commission in fifty-nine fathoms mud, east of Rio Janeiro, Brazil, were a number of valves which were inadvertently put away among a lot of *Astartes*. On overhauling the latter, lately, these valves were found

and re-examined, proving to be an undescribed species of *Crassatellites* from a region where none had been reported hitherto.

CRASSATELLITES BRASILIENSIS n. sp.

Shell solid, small for the genus, yellowish-white, covered with a thin brownish periostracum; valves ovate, slightly squarish behind, rapidly descending and rounded in front, with pointed, slightly flattened beaks, sculptured with a few (5 to 10) low concentric waves beyond which the disk is smooth, or concentrically striated with some very obscure, fine, radial lines near the anterior base; lunule narrow, elongate, bounded by an obscure sulcus inside of which the area is excavated; escutcheon similar but much larger; basal margin minutely crenulate within, hinge normal, the resilium immersed but rather short and wide; muscular impressions well defined. Height 27.5: length 36; diameter 15 mm., some specimens being proportionately a little shorter.

The posterior end is obscurely truncate, but in some specimens slightly rostrate. On the whole, the species has much the aspect externally of a smoothish *Astarte*. The bottom temperature where dredged was 57° Fahr. The beaks are usually a little behind the anterior third of the valves.

SHELL COLLECTING ON THE MISSISSIPPI.

BY FRANK C. BAKER.

For a number of years it has been the custom of the Chicago Academy of Sciences to have a Field-day some time during the month of July and to spend the day investigating some notable or particularly interesting locality, from a zoölogical, botanical or geological standpoint. These excursions are not only attended by members of the Academy, but by the faculties and students of the Chicago University, the Northwestern University and kindred scholastic bodies.

Saturday, July 12th, was chosen as the field-day for 1902, which dawned bright and pleasant. About one hundred and fifty people, including many of the charming "co-eds" from the Zoölogical Department of the Chicago University, met at the Chicago, Milwaukee and St. Paul depot, from which the special train left at eight o'clock

for Savanna, Illinois, our objective point. The ride consumed several hours and we arrived in sight of the Mississippi about noon.

Our first thought was for the "inner man," and we hastened in a body to the river bank, where we bargained with the boat renters and secured row-boats. No sooner were our bargains completed than we scrambled into our boats and rowed across the river toward a group of islands, where we ate our lunches.

The pull across the river was very interesting, especially to several of the "co-eds," who bravely volunteered to row one or two of the boats, for there was a seven-mile current which made this a matter of great exertion. The writer had never before seen the "Father of Waters," and he must confess that a peculiar feeling came over him as he rowed across the swiftly-flowing stream and thought of the many historic scenes which had taken place on or near this mighty river since De Soto first saw it. But the most interesting fact *to him* in connection with this river was that it afforded a home for more Unios than any other stream in the world.

As soon as lunch was out of the way we began a hunt for clams, and before the time arrived for the departure of our train we had accumulated several bushels, beside numerous examples of freshwater gastropods, such as *Campeloma* and *Vivipara*.

About a mile above Savanna we found several men engaged in "fishing" for clams, which they sold to the button-factories at Muscatine and other places in Iowa and Illinois. Their method of fishing was ingenious. A bar of iron (frequently a gas pipe) six or seven feet long is strung with four-pronged hooks, made of bent and twisted telegraph wire. The strings are about five inches apart and two or three hooks are attached to each string, making two or three rows of hooks attached to the bar. As many as forty hooks are frequently strung on one bar, the whole appliance being locally known as a "crowfoot" dredge or grapple. A piece of rope is tied near each end of the bar, forming a sort of bridle, and to this is fastened another rope, twenty-five or more feet in length, by which the dredge is pulled over the bottom of the river.

At first sight one would hardly suppose that with such an instrument a person would be able to gather very many clams, but the fishermen told us that several tons could be obtained with this apparatus in a comparatively short time. The clams are caught in this way: in many parts of the river the Unios lie packed by thousands,

their shells half protruding from the mud and slightly gaping, as is natural with all these mollusks when at rest. As the fisherman pulls the dredge along the bottom over these *Unio* beds the prongs of the hooks become caught between the open valves of the shell, which immediately close and fasten themselves to the prong. A single haul may yield over one hundred shells caught in this way.

The inordinate collecting of shells for the button industry bids fair to exhaust the supply before many years have passed unless wise laws are enacted and enforced. Not only are many tons of these shells taken every year, but a large number are wilfully wasted by the fishermen. An example of this waste came under the notice of the writer on this occasion. Having failed to secure as many specimens as were wanted, a fisherman was asked if he knew a good place to gather clams. He replied that just above a large grain elevator some fishermen had dumped a boat-load on the shore. Not realizing fully what he meant, we walked to the spot indicated and there beheld a sight which made at least one of the party both glad and sad. Piled on the shore for a distance of a quarter of a mile were thousands upon thousands of clams, some alive, others with gaping shells and a few entirely devoid of the animal. Not less than twenty-five species were represented, many of them useless for the manufacture of buttons, but of great value to the conchologist of the future who may wish to study these species. The fishermen were either too lazy to throw them back into the water or else thought that if they threw them on the shore they would avoid catching them again on their hooks. Such wanton destruction as this, if not stopped, will soon exterminate many of the species. Those which were thus destroyed were comparatively thin shelled, such as *Anodonta*, *Alasmidonta* and *Symphynota*.

The species collected by the different parties were as follows :

<i>Lampsilis ventricosa</i> Barnes.	<i>Plagiola securis</i> Lea.
<i>ligamentina</i> Lamarck.	<i>elegans</i> Lea.
<i>anodontoides</i> Lea.	<i>Obliquaria reflexa</i> Rafinesque.
<i>fallaciosa</i> (Smith) Simpson.	<i>Strophitus edentulus</i> Say.
<i>recta</i> Lamarck.	<i>Anodonta corpulenta</i> Cooper.
<i>parva</i> Barnes.	<i>Arcidens confragosus</i> Say.
<i>alata</i> Say. ¹	<i>Symphynota costata</i> Rafinesque.
<i>gracilis</i> Barnes.	<i>complanata</i> Barnes.
<i>leptodon</i> Rafinesque.	<i>Unio gibbosus</i> Barnes.

¹ One specimen of *alata* was curiously deformed, one valve being perfectly flat while the other was very convex.

<i>Unio crassidens</i> Lamarek.	<i>obliqua</i> Lamarek.
<i>Pleurobema æsopus</i> Green.	<i>ebena</i> Lea. ¹
<i>Quadrula plicata</i> Say.	<i>tuberculata</i> Rafinesque.
<i>undulata</i> Barnes.	<i>metanevra</i> Rafinesque.
<i>heros</i> Say.	<i>Vivipara intertexta</i> Say.
<i>lachrymosa</i> Lea.	<i>Campeloma integrum</i> DeKay.
<i>pustulosa</i> Lea.	<i>subsolidum</i> Anthony.
<i>pustulata</i> Lea.	<i>Polygyra multilineata</i> Say.
<i>trigona</i> Lea.	

The last was found to be a common inhabitant of the islands in the river and in the woods bordering the Iowa side of the river.

At Carroll Creek, ten miles from Savanna, Mr. C. C. Adams, of the University of Chicago, collected the following species, all being very common :

<i>Amnicola limosa</i> Say.	<i>Physa integra</i> Haldeman.
<i>Physa gyrina</i> Say.	<i>Succinea ovalis</i> Say.

A NEW FOSSIL ASHMUNELLA.

BY T. D. A. COCKERELL.

ASHMUNELLA THOMPSONIANA PECOSENSIS subsp. nov.

Small (diam. max. 12, min. 10.5 mm.); last half of last whorl very distinctly transversely ribbed, recalling *A. altissima*; lip and teeth strongly developed, basal tooth single.

Hab.: Vallé Ranch, Pecos, New Mexico, in a light reddish deposit of uncertain age, Nov. 30, 1902. (T. D. A. and W. P. Cockerell.) The commonest shell in the deposit is *Pyramidula strigosa cooperi*. *Vallonia cyclophorella* is also abundant.

Last year my wife collected a dead shell of a recent *Ashmunella* at the old Pecos Pueblo, which is only a few miles from the Vallé Ranch. It is *A. thomsoniana*, with max. diam. 13.5 mm., basal tooth single. There is no sign of the ribbing of the fossil form.

¹ This species is called "nigger-head" by the fishermen, and is considered the most desirable shell for the cutting of pearl buttons.

NOTES ON SOME SHELLS FROM NORTH CAROLINA.

BY E. G. VANATTA.

OMPHALINA RUGELI OXYCOCCUS n. var.

This variety is distinguished from the typical *O. rugeli* Binn. by being densely microscopically granulate above and having the base nearly smooth.

The type is in the collection of the Academy of Natural Sciences of Philadelphia, No. 68743, collected by Mr. H. W. Wenzel, June, 1896, at Cranberry, N. C.

Locality: Cranberry, N. C., collected by Mr. H. W. Wenzel, Dr. Henry Skinner and Mrs. Geo. Andrews; also at Banners Elk, Watauga Co., N. C., by Mrs. Geo. Andrews.

The following species were collected by Mr. Joseph Willcox during July, 1902.

At Blowing Rock, Watauga Co., N. C., the following were taken :
Goniobasis proxima Say (3500 Polygyra andrewsæ normalis Pils.
feet elevation). Circinaria concava Say.

Polygyra albolabris Say. *Philomycus carolinensis* Bosc.

And at Cranberry, Mitchell Co., N. C., the following species :

<i>Polygyra andrewsæ normalis</i> Pils.	<i>Polygyra tridentata</i> Say.
<i>monodon fraterna</i> Say.	<i>Vitrinizonites latissimus</i> Lewis.
<i>stenotrema</i> Fér.	<i>Circinaria concava</i> Say.
<i>thyroides</i> Say.	<i>Pyramidula perspectiva</i> Say.
<i>subpalliat</i> Pils.	

NOTES.

HAWAIIAN PHYSIDÆ.—It has been held by Pease and others that the reversed fresh-water shells resembling *Physa*, found in the Hawaiian Islands, are all Limnæids belonging to *Ameria* or some related group. Part of them certainly are, but a species, believed to be *Physa compacta* Pease, received from Mr. H. W. Henshaw, of Hilo, Hawaii, proves, on anatomical examination, to be a *Physa*, though whether referable to *Physa* s.s. or to *Aplexa* cannot be determined, owing to the contraction of the mantle edge which, in spirits, appears not to be digitate.—W. H. DALL.

"PYRAMIDULA" STRIGOSA CONCENTRATA.—I have lately re-

ceived a couple of specimens of this form (max. diam. barely over 12 mm.), collected by Mr. C. S. Onderdonk, at Alpine, Chaffee county, Colorado, at between 10,000 and 12,000 ft. This is a long way from the original locality, but I sent one to Dr. Dall, who certified that it is the genuine *concentrata*. There are two dark bands, both narrow but strongly developed. This var. *concentrata* is extremely close to my var. *minor* (max. diam. 14 mm.), described in Journ. of Conchology, 1890, p, 175. The latter, however, is not alpine.

No doubt the Colorado *concentrata* have evolved independently from the New Mexico and Arizona ones, and, therefore, might perhaps be considered entitled to a different name.—T. D. A. COCKERELL.

ERRATUM.

NAUTILUS, p. 96, line 8 from top: For *coniformis* read *corviformis*.—T. D. A. COCKERELL.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF THE MT. MITCHELL REGION, NORTH CAROLINA.—By Bryant Walker and H. A. Pilsbry. Proc. Acad. Nat. Sci., Phila., 1902, pp. 413-442, Pls. xxiv, xxv.—In vol. xiv, p. 45, we noticed Professor Pilsbry's account of the Mollusca of the Great Smoky Mountains. The present paper sets forth the results of the exploration of the French Broad river region by Messrs. Ferriss and Walker "and two ladies" in 1901. The Roan Mountain fauna being pretty well known from the investigations of Wetherby, Walker and others, it now becomes possible to determine with some degree of accuracy the range of the different species in this part of North Carolina and adjacent Tennessee. It had previously been made clear that the Roan Mountains and Great Smoky regions, though only about seventy-five miles apart, possessed molluscan faunæ which were by no means identical; the expedition of 1901 sought to determine whether the valley of the French Broad river might be the dividing line between the Roan and Great Smoky faunæ, and whether Mt. Mitchell, with an altitude of 6,711 ft., might not produce something peculiar to itself. With the results of the expedition before them, the authors conclude that the French Broad river is not the dividing line between the two faunæ just mentioned, and, in fact,

that there is probably no sharp line of demarcation anywhere. It is found, however, that the French Broad river region has itself some of the characteristics of a distinct faunula, although Mt. Mitchell, the centre of the explorer's hopes, proved disappointing. A comparative list, showing the distribution of the species, is presented on pp. 420, 421. To the Roan Mountains list should be added *Philomycus secretus*, described from thence, and *Vitrea carolinensis wetherbyi*,¹ sent to the present writer from Roan Mountain by Wetherby. The true *V. carolinensis* probably does not occur at Roan Mountain, as I gathered from Wetherby's letter when sending the *wetherbyi*, that he knew only the latter.

Leaving out a few probably erroneous records, we find 105 species and races of land mollusca recorded from the whole region discussed. Of these, only 33 are recorded as common to all three faunulæ, *i. e.*, the Roan, French Broad and Great Smoky. Three are common to the Roan and Great Smoky regions, and have very likely been overlooked in the French Broad. 25 are from the Roan alone, 10 from the Roan and French Broad, 8 from the French Broad alone, 7 from the French Broad and Great Smoky and 19 from the Great Smoky alone.

The same peculiar features of the fauna as were observed in the Great Smokies are seen in the Mt. Mitchell region. The Pupidæ are represented by a single example of *Strobilops*, and this a southern form. Not a single Limmæid was found anywhere; not even *Physa*.

The new forms described in the paper are: *Polygyra tridentata tennesseensis* W. & P., *P. andrewsæ intermedia* W. & P., *Vitrea approxima* W. & P., *V. vanattai* P. & W., *Gastrodonta gularis theloides* A. D. Brown MS., and *G. gularis decussata* Pils. & Van.; while *Polygyra hirsuta* vars. *altispira* and *pilula* are raised to specific rank. *Pyramidula alternata mordax* was rediscovered by the expedition, and is fully discussed and figured.

Altogether, the paper is certainly a most satisfactory one, and we can only hope that it will be followed by a long series of similar ones. It will be some time before Messrs. Pilsbry, Walker, Ferriss and their friends exhaust the possibilities of the Appalachian Mountains, which seem to contain an extraordinarily varied and interesting molluscan fauna.—T. D. A. COCKERELL.

¹ On page 430, the date of publication of *wetherbyi* is said to be 1901. It should be 1900.



MCDONALD LAKE, MISSION MTS., MONTANA.

THE NAUTILUS.

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No. 10.

NOTES ON PYRAMIDULA ELRODI PILS.

BY MORTON J. ELROD.

This shell was first collected on the sides of the Mission Mountains, above Post Lake, in the summer of 1899. About forty were taken, all dead. Specimens were sent to Dr. Pilsbry, of the Philadelphia Academy of Sciences, who described the species in NAUTILUS, Vol. XIV, 40, naming the shell after the collector.

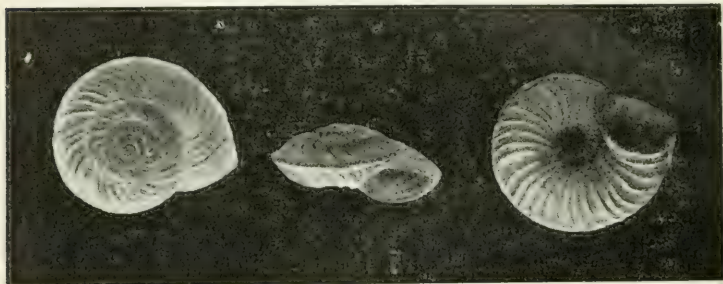
During the collecting expedition of the University of Montana Biological Station, in July, 1900, a stay of ten days was made at McDonald Lake for the express purpose of making further investigations of this species. During this time some three quarts of specimens were collected, of all sizes and varying colors, from the dark brown of the living shells to the bleached white of the dead ones. Also some three dozen living snails were secured, which were drowned, and in a number of cases, beautifully expanded.

The distribution of the species, so far as known, appears to be quite local, and is deserving of further study. At present it seems confined to the mountain slopes forming the amphitheatre around and to the east of Post Lake. On the south side of the lake, owing to the dryness of the rocks and soil, it appears very scarce, one living and several dead shells being the result of an afternoon's search. A search on the north bank during the same time on the same day resulted in a quart of shells, a dozen living. While no search has been made in the mountain slopes east of the lake, there can be little doubt of its presence, since the shell is found on both sides of the lake.

On the north slope of the lake four small streams tumble over the

rocky wall of the mountains, making beautiful little cascades. The first of these, beginning next the plain, appears to come out of the rocks high up, flows through a small canon between the cliffs, and shortly afterward disappears in the loose talus below. Earlier in the year these loose, talus rocks are wet with melted snow, but at the time of collecting, in July, they were hot and dry.

On the talus below the first fall, shells were found abundantly. On the talus of the ravine, a few feet to the west, only a few were found, while still further west none whatever could be found anywhere. This little stream from the mountain, therefore, seems to mark its distribution on the mountain towards the west. Acting on this basis, the rocks were followed upward along the sides of the



mountain, following the little gully of the stream mentioned. Shells were found as high as we went, a distance of 1,500 feet, or up to a total elevation of 5,000 feet above the sea. Time did not permit a search higher.

The limit of distribution of the shells, as mentioned, ends abruptly. A search eastward from the mountain stream caused the discovery of shells in abundance for a mile; beyond this we did not go. There is a great deal of difficult mountain climbing necessary to explore these regions, and a half day does not permit one to go far. But from the fact that they have been found on the slopes of Mt. McDonald, across the lake to the south, it would appear evident that the unexplored canons and mountain sides forming the large amphitheater supplying the lake's waters, support the *Pyramidulas*.

The writer has been in different places in the Mission range, from one end to the other, on the western slopes, and nowhere else have

the shells been found. Whether or not they are on the eastern slopes, on the Swan river side, is yet to be determined.

The habits of the shells are very peculiar. Shells are rarely found among the bushes or where there is much vegetation. They are found on the surface among the loose rocks of medium size, but not among the large boulders or the finer talus. When bleached, they are a beautiful white, their color against the dark brown or lichen-colored sandstone making them very conspicuous objects. The corrugations show plainly from a distance, and there is no difficulty whatever in seeing the dead shells when in the region where they are to be found.

The living ones are not so easily discovered. They are dark brown, almost identical in color with the rocks among which they live, and very easily overlooked. When the animal dies the color changes to a delicate pink, and later the shell becomes a beautiful clear and pearly-white.

A search was begun for living shells by following up the talus where the shells were found most abundantly. After descending over a thousand feet, we came to a small ledge of rock forming a sharp promontory with a cliff below, on which we stopped to take a photograph of McDonald Peak, which showed up beautifully from this point. This ledge forms the western wall for the small canon through which the aforementioned stream comes. The loose rocks on the top of the cliff were overturned. It was with much surprise that shells were picked up, and among them one apparently alive. Diligent search revealed the fact that this small ledge, not more than thirty feet in extent, was the home of a colony of these interesting creatures. A quart of shells was secured, among them a dozen live ones, the first ever found. This ledge is shown on the left of the picture.

This home of the shell is very interesting and romantic. Living on the cliffs of one of the most rugged ranges in the State, with scant vegetation, it has a life common to few shells. It prefers the crannies among the loose rocks, hiding there from enemies.

After finding this first colony, a second trip was made over the same route, only farther up the mountain. Other colonies were found, with occasionally a live one. Search was then made lower down, among the rocks near the lake, resulting in finding live ones at different places, though to do so required considerable digging in

the rocks, in order to get down below the hot, dry rocks to where there was a little moisture.

It seems apparent that the living shells live among the loose stones, in the early spring crawling around over the damp rocks. As the warm spring and summer days approach, the rocks become dry. The snails previously crawling over them cease activity, and instead of all of them crawling for protection under the loose rock, some throw their protective film across the opening of the shell while yet on the rocks; the sun kills the animal, which dies, leaving the dead shell to bleach and become a conspicuous feature on the rocks. Here the shells remain, very few of them washing any distance.

All of the living shells taken appeared dead except a few. Invariably, however, when a shell sank in water the snail within was alive. It is probable that the species is continued by the hibernation of some of the more fortunate individuals which are deeper in the rocks, where there is more moisture.

ADAPTATION OF MOLLUSKS TO CHANGED CONDITIONS.

BY A. C. BILLUPS, LAWRENCEBURG, INDIANA.

Many years ago the Ohio river at and below Cincinnati, Ohio, was one of the most prolific hunting grounds of the collector of the fresh-water species of mollusks. At that time abounded in immense numbers (as is shown by the large quantities of duplicates in the collections of all the old collectors) *Anculosa praerosa* Say. About twelve years ago this shell disappeared almost entirely and for many years not a single specimen was found; this year, however, a few adults and large numbers of young shells have been found in localities where it is certain that no shells have existed for many years. The explanation of this occurrence is as follows; *A. praerosa* Say was a long time ago one of the most common of the river snails; the growth of the city of Cincinnati and the numerous factories along the banks of the river, each and every one adding to the filth of the water, pouring in sewage and acids, have rendered the water so foul that the *Anculosa* of the old day have been exterminated, all but a few of the most hardy of the species, which probably crawled to the lowest and most inaccessible parts of the river, where they managed to exist and to produce young: the young shells have become more used to the changed conditions, which worked such havoc with their ancestors,

and their descendants are so little affected by the foul water that they are now thoroughly acclimated and are producing young in large numbers used to the surrounding conditions. As this is the case, we may now look for *Anculosa praerosa* Say in nearly all its old haunts, where it will thrive under conditions which would have proved fatal to its ancestors. Many of our forest snails have been forced, by the clearing of the timber and tilling of the soil, to more or less adapt themselves to conditions not slightly, but very materially changed from those to which they were originally used. One of the most ready to take to the new mode of life was perhaps *Pyramidula alternata* Say, which is now one of the most sociable snails that exists in North America; this snail can be found in all our cities and doing well surrounded by conditions which are, without the slightest doubt, entirely strange to its nature—the rubbish heaps in every back yard harboring hundreds of fine and well-developed specimens in every stage of growth. Another forest snail which has taken kindly to open country life is *Polygyra appressa* Say. By setting a trap (a board greased with lard, placed about one inch above the ground) in a dark and damp alley between two houses in a low part of the town, I captured in ten nights the following number of snails: 9, 12, 10, 13, 26, 23, 18, 21, 12, 11—in all 155 adult specimens; young and immature specimens were not counted. This trap cleaned up all the snails in the immediate vicinity, as after that date the captures began to drop off and at the end of three weeks no more were taken. *P. monodon* Rack. and *inflecta* Say have in a smaller degree taken to open country life and are now common on nearly every railroad cut or fill under old cross-ties, but in nearly every instance deprived of the shade of the trees which seemed to be so necessary to their original abode. With *Pol. albolabris* Say and *exoleta* Binn., however, the change from woodland to open country does not agree. I have for years tried the experiment of transporting these eminently forest snails to places which, while being favorable for their maintenance, were still very different from their native haunts, and the result has been with both species a signal failure, and of three thousand that I transported three years ago, a very few only have managed to survive. They laid many eggs but very few of them ever hatched, and at the present time I doubt if there are twenty living snails to be found. *Pol. thyroides* Say is perhaps of the larger snails the most hardy, and the least affected by changed conditions. Mr Geo. H.

Clapp, of Pittsburg, Pa., informs me that *Vallonia* has adapted itself to open life and can now be collected in immense numbers in places very different from its original haunts. The question of the adaptation of mollusks to changed conditions is one of great interest, and in no country can the subject be so well studied as in America, where man and man's inventions change the whole face of an immense tract of country in a very short time. We know that the object of molluscan life (and in fact all life) is to preserve its own existence and to reproduce its own species. With rapidly-changing conditions, the snail must either adapt itself to these conditions or cease to exist, and it will be most interesting for many years to come to watch the struggle and to record the cases of success or failure. Complete local lists of species carefully made up, collections of large series of species from every possible locality and a knowledge of that locality and its conditions, will enable all students in this branch of molluscan evolution to arrive at a convincing and satisfactory conclusion. While in the older countries of Europe the forest snail has become now adapted to open country life, we have no records to bear upon the time when this change was taking place, and in all probability it was much more gradual than will be the case in this country of rapid and great changes.

NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

As already stated in a former number of the NAUTILUS, Mr. Nakada spent the autumn in exploration in the Hokuriku region, which includes provinces along the west coast of middle Hondo. The material examined shows that area to have but few endemic species, most of those collected being widely-distributed forms, already well known from other places. He reached Sado Island, where he found numerous species, the more interesting being a handsome new *Euhadra*, a sharply-carinate new *Helicina*, and specimens of *Blanfordia japonica* A. Adams. This last is perfectly distinct from the mainland form I called *B. jap.* var. *simplex*, which will now be raised to specific rank. *B. japonica* has a strong rounded ridge or varix behind the lip, such as is seen in many *Truncatellas*. Mr. Nakada returned to Kyoto, and started, November 5th, for Tosa province, in

Shikoku, with Mr. Adzama. We hope to have still more good things from this prolific province.

Mr. Hatai, who assisted Mr. Nakada in Ogasawara (Bonin Islands), continued to collect there after Mr. Nakada's return. On September 25th he started from Chichijima to go to Yuo-jima, small islands southward from the Ogasawara group. He reached Kita-Yuō-jima safely, but owing to stormy weather, a landing on Naka-Yuō-jima could not be made. The vessel stayed at sea, but the storm increased, and the ship was lost. After more than eighty days, no tidings of him have come. Mr. Hatai was faithful to the work, and his untimely loss through his efforts to increase our knowledge of these island faunas is deeply felt.

Eulota (Euhadra) sadoensis P. & H., n. sp.

Shell rather narrowly umbilicate, somewhat trochoidal, buff-whitish, with a sharply-defined dark chestnut band just above the periphery, a wider one, fading at the edges, on the upper surface, and a very broad band extending over most of the base, the interior of the umbilicus also dark; these bands leave the pale ground-color in narrow belts below the suture, above and below the periphery, and around the umbilicus. Surface glossy, irregularly obliquely striate, and showing the usual very fine spiral lines. Spire elevated, conic, the apex obtuse. Whorls $5\frac{1}{2}$, moderately convex, the last depressed but not angular, very slightly descending in front. Aperture very oblique, somewhat lunate; peristome expanded and reflexed, dilated half over the umbilicus, white, except where colored by the bands. Alt. 17, diam. 24 mm.

Sotokaifu-mura, Sado. Type no. 83909 A. N. S. P., from no. 994 of Mr. Hirase's collection.

This seems quite distinct from other members of the *peleiomphala* group of *Helices*. The coloration reminds one of *Epiphragmophora mormonum* var. *cala*.

Eulota (Plectotropis) kiuisiensis var. *oshimana* n. var.

Similar to *E. kiuisiensis* in texture, sculpture, umbilicus and peripheral keel; but the spire is higher, and the color chestnut-brown instead of yellowish.

Oshima, Osumi. Types no. 83891 A. N. S. P., from no. 914 of Mr. Hirase's collection.

Ganesella notoensis Pils. & Hir., n. sp.

Shell imperforate, resembling *G. stearnsi* and *G. papilliformis* in general shape; pale greenish-buff, thin, dull with the luster of silk, but the early whorls are glossy, and there are some narrow, oblique, glossy streaks. Smooth to the eye, but under a lens showing slight growth-lines and almost obsolete spiral striation. Spire high, with slightly convex outlines. Whorls $6\frac{1}{2}$, moderately convex, the last slowly descending in front, convex beneath. Aperture very oblique, round-lunate, the peristome narrowly expanded, subreflexed; columella vertical, narrow, dilated over the umbilicus and appressed. Alt. 23, diam. 19 mm.

Kitanoshō, Noto. Type no. 83892 A. N. S. P., from no. 289 c of Mr. Hirase's collection.

This is a pale species, differing from *G. stearnsi* in color and the less convex whorls, which in *stearnsi* are swollen just below the suture. In *G. pagodula* and *G. papilliformis* the columella is different in shape.

Ganesella cardiostoma var. *kagaensis* Pils. & Hir., n. var.

Shell imperforate, somewhat globosely conic, light chestnut-colored, with an indistinct, pale, peripheral band; thin, somewhat transparent, smooth and glossy, slightly wrinkled by growth-lines, and very densely, minute striate spirally. Spire conic, with convex outlines. Whorls $5\frac{1}{2}$, convex, the last rounded peripherally, *very convex beneath*, especially at the last half; slightly descending in front, and contracted behind the lip. Aperture oblique, lunate-triangular, the lip thin, brownish, expanded, reflexed below, the steeply-sloping baso-columellar margin straightened, dilated over the umbilicus, where the base is deeply impressed. Alt. 13, diam. 14 mm.

Hakusan, Kaga. Type no. 84321 A. N. S. P., from no. 975 of Mr. Hirase's collection.

This form differs from *G. cardiostoma* Kob. (described from Kyoto, but not yet found there by Mr. Hirase), in the darker color (*cardiostoma* being yellowish-corneous, like *japonica*), and the very convex base, while *cardiostoma* is said to be flattened there.

Chloritis echizenensis Pils. & Hir., n. sp.

Shell shaped almost exactly like *C. bracteatus*, but glossy, the raised dots (not hairs) far less crowded, though still close; the apex

more obtuse, earlier $2\frac{1}{2}$ whorls coiled about in a plane. The sculpture is about as close as in *C. pumila*, but the processes are shorter, the shell larger, more elevated and glossy. *C. perpunctatus* is more depressed, smaller and narrowly umbilicate, while in *echizenensis* the perforation is almost closed by the reflection of the lip at its axial insertion. Alt. 13, diam. 19 mm., whorls $4\frac{1}{2}$.

Omiishi, Echizen. Type no. 84256 A. N. S. P., from no. 981 of Mr. Hirase's collection.

Related to the several species mentioned above, and best described by a comparison with them.

NOTE ON TRITONIA PALMERI COOPER, 1882.

BY T. D. A. COCKERELL.

The type locality of this species is San Diego, California, where it is said to be common. Cooper's description would hardly distinguish it from allied species, but as I know of only one species from southern California according with the description of *T. palmeri*, I assume that it is in fact the animal Cooper had in hand. The following notes, based on a specimen collected by Dr. W. R. Coe at Deadman's Island, San Pedro, California, July 18, 1901, may serve to facilitate the recognition of the species. The description is from life.

Length about 17 mm.; white, suffused with yellow dorsally; tentacles pale yellowish-brown; ends of lamellæ yellowish; dorsum rugose with small warts. Close to *T. lineata* A. & H., but differs by its strong yellow suffusion above and absence of opaque white dorsal lines. Ramose branchial lamellæ irregularly bipinnate, five on each side. Veil bilobed, each lobe produced into five or six finger-like filaments (two in *T. lineata*). Tentacles almost as in *T. lineata*; with the principal axis cylindrical and truncate, and numerous lateral branched processes, not so long as central axis. No eyes visible.

The species of *Tritonia* seem to be most easily distinguished by the character of the veil. *T. palmeri* has more processes on the veil than *T. lineata*, but very much fewer than in *T. holmbergii*, in which, however, they are very short.

SOME HOMONYMOUS GENERIC NAMES

BY T. D. A. COCKERELL.

In the course of some recent investigations, I found that certain names proposed by Mr. C. T. Simpson (Proc. U. S. Natl. Museum, 1900) for groups of Naiades were homonyms. I wrote to Mr. Simpson, asking him to propose substitutes, but he has preferred to leave this in my hands. The names are:

Dalliella Simpson, t. c., p. 832 (not *Dalliella* Cossmann, 1895). This may be called *Simpsonella*; type *Simpsonella purpurea* (*Anodonta purpurea* Val.).

Aurora Simpson, t. c., p. 849 (not *Aurora* Rag., 1888, nor *Aurora* Sollas, 1888). This may be called *Diaurora*.

Anodontoides Simpson, is later than *Anodontodes* Hamps., but the difference of a letter is sufficient to prevent homonymy.

The name *Carinella* Mabille, pertaining to a tolerably distinct section of *Arion*, is a homonym of *Carinella* Sowerby, 1839. If it is thought worth while for the section mentioned to have a name, a new one must be found.

Geyeria Buckman, 1899, for a genus of Ammonites, is a homonym of *Geyeria* Buchecker, 1880.

Paratropis Boettger, 1891 (sect. of *Omphalotropis*), is a homonym of *Paratropis* Simon, 1889.

In 1890, Brauer and Bergenstamm gave the name *Paramenia* to a genus of Diptera from New Zealand. In 1891, Pruvot applied the same name to a genus of Aplacophora (Arch. Zool. Expér., ix). Under these circumstances, *Pararrhopalia* Simroth, 1893, regarded as a subgenus of *Paramenia* Pruvot, may stand as a genus; type *Pararrhopalia pruvoti* (*Paramenia pruvoti* Sims.). Typical *Paramenia* Pruvot may be called *Pruvotina*.

Ridleya Ancy, 1901, is later than *Ridleia* Dendy, 1888, but I think both may stand, by the difference of a letter.

Ischnodactylus Cossmann, 1890, is a homonym of *Ischnodactylus* Pels., 1886. *Pasithea* Hartman, 1881, invalidates *Pasithea* Meyrick, 1883, the first being a genus of Mollusca, the second of insects.

Zygænopsis Felder, 1874, prevents the use of *Zygænopsis* Rochebrune, 1884, proposed for a genus of Mollusca.

GENERAL NOTES.

ZONITOIDES ARBOREUS (Say) IN JAPAN.—In a recent lot of shells sent by Mr. Hirase, there are specimens of this common North American species, from Tokyo. The shells are quite indistinguishable from American specimens. One with the soft parts dried in enabled me to compare the dentition, which proves to be substantially that of the American species, the formula being 20.6.1.6.20. In a *Philadelphia arboreus* examined there are 19.6.1.6.19 teeth, the shapes of the individual teeth being the same in both. A slender, nearly straight dart, in a club-shaped sack, was found in the Tokyo specimen.

The form described by me as *Z. subarboreus*, from Hachijo island, Izu, is distinguishable chiefly by the somewhat larger size, and the same seems to be true of *H. yessoensis* Reinh., described from Hakodate, which is probably also a *Zonitoides*, but I have not yet seen specimens.—H. A. PILSBRY.

I have recently found a very fine reversed specimen of *Polygyra profunda* Say in Hamilton Co., Ohio, not far from Laurenceburg.—A. C. BILLUPS.

At the December meeting of the Section on Conchology of the Brooklyn Institute, the president of the Section, Dr. R. Ellsworth Call, exhibited a reversed specimen of *Mesodon exoleta*, which is very rare in that form.

Mr. Wm. H. Weeks, Jr., reported on a collecting trip on the coast of Maine, as follows:

“*Shell Collecting on Cliff Island, Casco Bay, Maine.*—So much has been said regarding the conchologist at Casco Bay that little can be added. The writer spent a most delightful ten days at Cliff Island during last August and much of that time was spent in hunting mollusks. Shore collecting gave fine suites of *Purpura lapillus*, *Littorina palliata*, *Littorina littorea*, *Littorea rudis*, *Acmaea testudinalis* and *Macoma fusca*. A diligent search on shore for the famous *Buccinum undatum* revealed only dead specimens, but fishermen brought in fine suites found in lobster traps, also fine specimens of *Neptunea decemcostata* and *Sipho islandicus* found well out to sea. Dredging gave sparingly such forms as *Astarte sulcata*, *Nucula proxima*, *Lyonsia hyalina*, *Nassa trivittata*, *Pecten magellanicus*, *Modiola modiolus*, etc. *Polinices heros* was obtained at low tide well off shore

and *Helix hortensis* was in abundance on the island. A few *Helix albolabris* were also captured."—F. H. AMES.

PUBLICATIONS RECEIVED.

AN ANNOTATED CATALOGUE OF SHELLS OF THE GENUS PARTULA in the Hartman collection belonging to the Carnegie Museum. By Herbert H. Smith (Ann. Carnegie Mus. I, no. 3). The rich series of Partulae brought together by Dr. W. D. Hartman, having passed with his collection into the possession of the Carnegie Museum, has now been catalogued, with full details concerning each of the 240 suites contained therein. The total number of species is 83, besides many named forms which Dr. Hartman regarded as varieties; in all 1,647 specimens. We feel rather skeptical about the specimens considered hybrids by Hartman (Catal., pp. 471-473). There is not much evidence of hybridism between really distinct species of Gastropods. The notes comprise the data accompanying each lot and more or less descriptive commentary on the shells themselves, but consist largely of extracts from the letters of Mr. Andrew Garrett, who collected the major part of the specimens. Within his province, Garrett was one of the best conchologists of his time, and his experience in the field gives his opinions on these shells great weight. The catalogue is arranged according to Dr. Hartman's latest MS.; and embodying as it does the results of both Hartman's and Garrett's mature thought on this difficult genus, it must be regarded as one of the most important papers on South Pacific land snails. Although Mr. Smith has modestly "abstained from expressing opinions and made only a few suggestions," his judicious notes earn for him the thanks of conchologists.

PRELIMINARY CATALOGUE of [Japanese] Marine Shells in the collection of the Natural History Department, Tokyo Imperial Household Museum. By T. Iwakawa. Part I, consisting of Cephalopoda, Pteropoda and Pectinibranchiata forms a book of 84 pp., recording 893 suites. Localities are carefully noted, both in English and Japanese, and the list will be chiefly useful to students of the Pacific fauna for the numerous definite Japanese localities. The known faunas of the Riukiu and Ogasawara groups, hitherto but little known, are largely increased by these records.



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12.

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ON THE SPECIFIC VALIDITY OF *CAMPELOMA MILESII* LEA.

BY BRYANT WALKER.

There has been considerable difference of opinion expressed, both in regard to the specific validity of this form and in regard to its relations to the other recognized species of the genus.

The types were collected by the late Manly Miles, formerly State Geologist of Michigan, in Branch Lake, Antrim county, in the extreme northwestern part of the State, and were described by Dr. Lea, in 1863.¹ Binney, in 1865,² included it in the aggregation which he assembled around *Campelema decisa*. Dr. James Lewis, in his review of Binney's work in the Am. Jour. of Conchology,³ declared that it "has claims to the rank of a species that must be recognized." And later, in the same Journal,⁴ associated it with *decisa* in the group characterized by "shells of thin texture, whorls usually regularly rounded, suture well impressed, spire regular in proportion and, when perfect, acute."

Tryon, in his continuation of Haldeman,⁵ concludes that "it does not exceed the usual variation of *decisa*," and does not allow it even varietal rank. Call, in his elaborate paper "On the Genus *Campelema*,"⁶ refers it to *C. subsolida* Anth. And in this he is followed

¹ Proc. Phil. Acad. Nat. Sci., 1863, p. 156.

² L. & F. W. Shells, Pt. III, p. 42 (1865).

³ A. J. of C., IV, p. 60 (1868).

⁴ A. J. of C., V, p. 33 (1869).

⁵ Mon. F. W. Univalve Moll., p. 28 (1870).

⁶ Bull. Wash. Coll. Lab. N. H. I., p. 155 (1886).

by Baker,¹ in his recent work on the "Mollusca of the Chicago Area." Lea's figure,² which is copied by Tryon, is either very poor or else represents an abnormal specimen. Binney's figure, which is stated to be from one of the types, is more accurate and represents the species as usually found at the present time.

Campeloma milesii has not as yet been recorded from outside the state of Michigan. In that State it has a well-defined and somewhat peculiar distribution and, wherever found, seems to preserve its essential characteristics as fully as any of the other recognized species of the genus (figs. 1, 2, 3, 4, 7, 8 and 9). It is an interesting coincidence, if nothing more, that its range is substantially the same as that of *Limnæa catascopium* and *Physa ancillaria magnalacustris*, which are the characteristic univalves of the shores of the Great Lakes and of the rivers and lakes in close proximity to them. The localities thus far recorded for *milesii* are the Detroit River, Saginaw Bay, Carp Lake and Crooked Lake Emmet county, Branch Lake Antrim county, North Lake on Beaver Island in Lake Michigan and the Pine River Marquette county. In most of these localities it is associated with *C. decisa* and in some with *C. rufa*. On the other hand, the range of *C. subsolida* in Michigan is quite different. This species on the eastern side of the State has not been found north of the Clinton River. On the western side it is abundant in the St. Joseph and Grand Rivers and apparently ranges as far north as Charlevoix, which is the only place where it has been found associated with *milesii*. Neither form has been reported from the interior of the State, and *subsolida* does not seem to be found in waters of any of the Great Lakes. From this, it is evident that the ranges of the two forms are quite different and only impinge in the extreme northwestern part of the lower peninsula.

Compared with *C. subsolida*, as found in the southern part of the State (fig. 11), and which is quite typical, it differs both in form and texture. *Subsolida* is a large, thick, heavy shell, with a blunt apex, sinuous lip and with a heavy white deposit on the parietal wall. It is practically free from erosion. On the other hand, *milesii* has a thin shell, a regularly-tapering, acute spire, a thin, transparent parietal callus, a much less sinuous lip, and is usually only about half the

¹ Moll. of Chi. Area, p. 361 (1902).

² Observations, XI, pl. 24, fig. 114.

size. It is extremely subject to erosion, and mature specimens with a perfect apex are comparatively rare. If, as has been stated, *milesii*, like *exilis*, is a sexual variation of *subsolida*, it is remarkable that it has not been found associated with that species in localities where that species is abundant, and it is still more remarkable that where it is found, its slender form is persistent and equally characteristic of both sexes. The only form of *subsolida* with which *milesii* can at all be compared, is the slender form from the Mississippi Valley known as *C. exilis* Anth. (fig. 10). Just what the relations of this form with the typical *subsolida* are, have never been satisfactorily explained. If, as generally considered, it is merely a sexual variation, it is a curious fact that it has never been found in any of the Michigan rivers where the typical form is abundant. But however that may be, while superficially resembling *milesii* in its slender elongated form, it differs, like the typical *subsolida*, in the shape of the spire, the less rounded whorls, and consequently less impressed suture, shape of the lip and texture. It seems clear, therefore, that *milesii* cannot be referred to *subsolida* even as a varietal form.

There yet remains to be considered its relation to the congeneric forms, with which it is frequently found associated. The characteristic color and texture of *C. rufa* are always sufficient to distinguish it, even when the erosion of the upper whorls has destroyed the outline of the more elongated *milesii*.

Lewis was quite right when he grouped *decisa* and *milesii* together, and it must be confessed that the exact relation of the two forms is not free from doubt. *Milesii* is more closely related to *decisa* than to any other species, and it is possible that when a greater abundance of material can be had, it may be relegated to varietal rank. But from our present knowledge, the forms seem quite as distinct as any of the more closely-related species of *Campeloma*, which are recognized, and it would seem better to keep them separate until their specific identity can be unquestionably established. Compared with *decisa* as it is commonly found, *milesii* is a thinner, more elongated shell, with a more acute apex; the upper whorls are more convex and the suture rather more deeply impressed; the aperture is smaller and narrower. This difference is well shown in the two forms as found together in the Pine River, Marquette county (figs. 9 and 12).

Then, too, there is a marked difference in the shape of the young when ready for extrusion. It will be remembered that Dr. Lewis

laid great stress on such differences in his study of this group, relying on the well-recognized principal that "marked differences in the embryos and young of a class of beings are specific." The young *milesii* when ready for extrusion is uniformly larger than the young of *decisa* (*milesii* 4.75 x 3.50, *decisa* 4.25 x 3.50 mill., specimens figured). The shell is more slender and noticeably more elongated, the apex being well elevated above the next whorl, while in *decisa* the apex is depressed, giving a planorboid shape to the apex, and rises scarcely if at all above the second whorl. This difference, shown by figs. 5 and 6 from the two species as found together in the Detroit River, is characteristic and persistent. There is no substantial variation in the young of the Detroit River *milesii*, and none in fourteen different lots of *decisa*, from localities as widely separated as Port Cram, N. J., Detroit River, Grand Rapids and Marquette county, Michigan. The color in both forms is the same, a pale green, and both have raised revolving lines of epidermal tissue.

It is unfortunate that no detailed anatomical examination of either species has ever been published. It is quite possible that when that is done, other differences will be found which will confirm the view herein expressed. In the meantime, it certainly seems advisable to recognize the specific validity of this interesting form.

EXPLANATION OF PLATE V.

1. *Campeloma milesii* Lea. Detroit River, Michigan.
2. *Campeloma milesii* Lea. Detroit River, Michigan.
3. *Campeloma milesii* Lea. Detroit River, Michigan.
4. *Campeloma milesii* Lea. Saginaw Bay, Michigan.
5. *Campeloma milesii* Lea. (Young.) Detroit River, Michigan.
6. *Campeloma decisa* Say. (Young.) Detroit River, Michigan.
7. *Campeloma milesii* Lea. Charlevoix, Michigan.
8. *Campeloma milesii* Lea. Carp L., Emmett Co., Michigan.
9. *Campeloma milesii* Lea. Pine River, Marquette Co., Mich.
10. *Campeloma exilis* Anth. Illinois River, Illinois.
11. *Campeloma subsolida* Anth. Clinton River, Macomb Co., Mich.
12. *Campeloma decisa* Say. Pine River, Marquette Co., Mich.

THE LAND SHELLS OF CALHOUN FALLS, S. C.

BY A. C. BILLUPS, LAWRENCEBURG, IND.

Local lists of shells, no matter how incomplete they may be, are always useful to those interested in the study of geographical distribution, and without them no work could be done in that branch to any degree of satisfaction.

Many collectors fail to make these lists because they deem them of little special interest, and because they feel they can give no account of any new thing. These lists of themselves form no article of great interest when taken singly, but when a large number of them, covering a large area of country, are brought together, they form a most valuable source of information to the specialist. It should be the aim of every naturalist to add his share to the sum of general knowledge, no matter how small that share may be, and for these reasons I feel it not wasted time to give the result of one day's hunt, in what most likely is an unworked locality.

This day's work took place at a bad time of year, on a cold, bright morning on the 9th of December, 1900, at a place known on the map as Calhoun Falls. I say on the map, as the Falls proper are a long three miles from the hotel, general store and saw mill bearing that name. They treated me well, however, at the hotel, as some sportsmen had spent the day there and had added a quantity of delicious game to the usual southern country fare of "hog and hominy." Between the combined resources of hotel and sportsmen, I put away one of the best dinners I ever sat down to, and one which I shall long remember.

Calhoun Falls, S. C., is in Abbeyville county, on the Sea Board Air Line, about twenty-five miles southwest of Greenwood, South Carolina, and fifty miles east of Athens, Georgia.

The country two miles back from the river is of a very sandy soil, interspersed with red clay, and the timber principally pine. The creeks are all small, sandy and swift, running over a bottom composed only of sand, and occasionally a few yards of bare rock buried in sand; they contain no molluscan life whatever, and time spent in their investigation is wasted.

The Savannah River, at a point about half a mile below the railroad bridge, breaks into a series of falls, or rather rapids, full of small

islands and rocks, and two miles below attains a width of nearly three-fourths of a mile. A few of these islands are of fairly large extent and heavily wooded with pine and oak.

The rapids extend for a distance of five miles and bear the same character throughout, the rocks all rest upon a clean, sandy bed, and over the entire length of the rapids I could find no trace of water shells of any description. The streams in this section of the country all seem to be alike in this respect, with the exception, perhaps, of Clear Creek, a stream about three miles from this point, which is said to contain large quantities of *Unio* of which, however, I have had none other than oral evidence.

The banks of the river on the South Carolina side are in many places very steep and covered with hard-wood timber. I may here state that it is only wasted time to attempt to find shells under pine logs. I have tried it often and always with the same results, namely, a tired back, torn hands, a considerable gain in bodily temperature, and few if any specimens to add to the bottle. As an athletic exercise it is without an equal, but from a collector's point of view, a decided failure.

Beginning at the railroad bridge and working down stream, comes a stretch of bottom land covered by one of the most dense cane brakes I ever saw, extending to the water edge, and which gives evidence of being submerged at high water. I turned many logs at this point but they were in too close contact with the clear sand and produced nothing.

Beyond and below this cane brake the banks of the river rise at a distance of fifty yards from the water to quite steep hills, thickly timbered with oak and maple, and the soil of a much more solid consistency. Here, under logs on the hill side, I found *Polygyra appressa* Say, *Polygyra stenotrema* Fer. and several *Zonitoides*, together with a few specimens of *Polygyra tridentata* Say. Under one log I found a colony of *Polygyra barbigera* Redf., but a most careful search under many other similar logs near by failed to discover any more. On the bottom land several water-soaked and spongy logs produced *Gastrodonta interna* Say and *Zonitoides elliotti* Say in great numbers, they were all obtained by picking the wood apart with a knife and shaking out the shells into a handkerchief. The contrast between the light delicate pink of the former and the pale green of the latter was very marked and beautiful.

After leaving this part of the bank I traversed two miles of red clay soil, covered with pine and shrub, which, though most carefully searched, produced nothing whatever. Below this, several streams were crossed, containing nothing but the usual sand and water.

The banks now become very steep and in many places the bare rocks are exposed, badly cracked and weather-worn. Here in the crevices of the limestone, so far back as to require the aid of a stick to reach them, I found some beautiful specimens of *Polygyra obstricta* Say, a few alive and many dead, at the base of the cliff.

Numerous specimens of *Polygyra* and *Pyramidula* were found among the loose and broken fragments of stone, which were here piled in great profusion, between the cliff and the river, but which were all above high-water mark.

Beyond this place, where the rocks are less numerous and covered by a rich, black soil, I took a few fine specimens of *Polygyra albolarbris major* Binn. alive and also found many dead and broken shells.

From this point I left for the hotel, by what I took to be a short cut through the woods but which proved to be very far from an air line. I reached home, however, after about a two hours' tramp, having spent one of the most enjoyable days I can remember, and well satisfied with the results of my trip. It must be remembered that this tramp was made at a very bad time of year and when all shells were in their winter quarters.

The following is a complete list of all the material taken :

SHELLS TAKEN AT CALHOUN FALLS, SOUTH CAROLINA.

Polygyra tridentata Say. A large, dark-colored shell, found quite plentifully among the loose rocks and broken fragments.

Polygyra tridentata var. A much smaller shell than the preceeding, showing a pinkish shade about the lip. Scarce, and in company with the above.

Polygyra rugeli Shutt. Quite common under logs.

Polygyra inflecta Say. Under logs and among loose stones.

Polygyra albolarbris major Binn. Under logs and chips in the black soil.

Polygyra palliata Say. Eight specimens from the heavily-timbered hill side.

Polygyra obstricta Say. From the cracks in the limestone cliffs.

Polygyra appressa Say. Among the loose stones with *tridentata*.

Polygyra elevata Say. Four dead shells only, in drift near the river.

Polygyra thyroides Say. Two dead and one living, on the hill side.

Polygyra barbiger Redf. A numerous colony under one log only, evidently in their winter quarters.

Polygyra stenotrema Fer. A small number, not common and generally distributed.

Polygyra stenotrema exodon Pils. Very common under the logs and loose stones. (Determined by Bryant Walker.)

Polygyra hirsuta Say. One or two specimens only.

Circinaria concava Say. Five adult and several partly-grown shells found, under leaves, logs and stones on the hill side.

Omphalina fuliginosa Griff. Several specimens, deep in thick beds of leaves.

Gastrodonta intertexta Binn. A few fine shells, in the earth under the logs.

Gastrodonta interna Say. Large numbers, in water-soaked logs near the river.

Zonitoides arboreus Say. Quite common, under the bark and in rotten wood.

Zonitoides elliotti Redf. Large numbers, in water-soaked logs.

Pyramidula alternata Say. A strongly-ribbed variety. Quite plentiful, under the large loose rocks.

Pyramidula perspectiva Say. Quite common, in decayed logs on the hill side.

Pyramidula striatella Anth. Scarce, in company with *P. striatella*.

Helicodiscus lineatus Say. Ten specimens, under bark of dead wood.

NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

Helicina sadoensis Pils. & Hir., n. sp.

Shell depressed and acutely carinate, about equally convex above and below, dull red or reddish-yellow, sculptured with fine, irregular wrinkle-striae and very fine, crowded spirals above and below. Spire low-conic with somewhat convex outlines. Whorls about 4, the last convex below, not descending in front. Aperture oblique, of the

usual shape; lip well expanded and thickened; a noticeable angle at the base of the columella. Umbilical callus small but rather thick, pox-marked. Operculum is sparsely granulose and retracts barely within the lip. Alt. 2.5, diam. 4.5 mm., to alt. 3, diam. 5 mm.

Sotokaifu, Sado. Types no. 84380, A. N. S. P., from no. 991 of Mr. Hirase's collection.

Related to *H. hakodadiensis* Hartm., but quite distinct by its acute peripheral keel.

Alycæus harimensis var. *sadoensis* n. v.

Similar to *A. harimensis* in size, form and striation, but the strongly constricted neck is quite smooth, the umbilicus is noticeably wider, the reflexed sutural process is more prominent, and the peristome is much thickened outside and beveled towards the edge.

Aikawa, Sado. Types no. 83895 A. N. S. P., from no. 996 of Mr. Hirase's collection.

Macrochlamys perfragilis var. *shikokuensis* Pils. & Hir., n. v.

Shell depressed, yellow, subtransparent, with the form of *M. perfragilis* Pils., of Oshima, Osumi, but with the same number of whorls it is much smaller. It is also very similar to *M. dulcis* Pils. in shape, but the umbilicus is narrower and almost closed by the triangular reflection of the columellar lip, and the very glossy surface is smooth, without the spiral lines of *M. dulcis*. Whorls $4\frac{1}{2}$, alt. 6.5, diam. 13 mm.

Kotsuzan, Awa (Shikoku). Type no 84259 A. N. S. P., from no. 1000 of Mr. Hirase's collection.

Microcystina higashiyamana Pils. & Hir., n. sp.

Shell minutely perforate, conic, brown, somewhat transparent, glossy, and marked with fine, indistinct growth-lines. Spire conic, the apex obtuse. $5\frac{1}{2}$ convex whorls, very slowly widening, the last distinctly angular at the periphery, convex beneath, a little impressed in the middle of the base. Aperture oblique, somewhat lunate, the outer lip simple, columellar lip turned back, strengthened by a nearly vertical white callus a little way within. Alt. 2.2, diam. 3 mm.

Higashiyama-mura, Awa, Shikoku Island. Type no. 84379, A. N. S. P., from no. 1002 of Mr. Hirase's collection.

Distinguished by the conic, *Kaliella*-like shape and the white callus within the columellar margin.

Buliminus andersonianus var. *echigoensis* P. & H., n. var.

Shell similar to *B. andersonianus* Mlldff. except that the spire is a little wider, not quite so straightly conic, and the size is much greater. Dark vinous-brown with a green-buff border below the suture, the mouth purple-bordered inside.

Length $29\frac{1}{2}$ to $30\frac{1}{2}$, diam. 11 to $11\frac{1}{2}$ mm.; whorls fully 8.

Myokōzan, Echigo. Types no. 83896 A. N. S. P., from no. 750a of Mr. Hirase's collection.

B. andersonianus was originally described from Yesso; but Mr. Hirase has found it not only in Ojima, the southern province of that island, but also in the province Uzen, in Nippon (Hondo); the specimens being typical. This large race is from still farther south.

HELICINA JAPONICA AND RELATED FORMS.

BY H. A. PILSBRY.

Helicina japonica was described from "Tabu-Sima," that is, Tobishima, an islet of the Province Ugo, on the west coast of Nippon. Adams gave no dimensions; but the figures in Sowerby's *Thesaurus Conchyliorum*, which were evidently drawn from his specimens, measure alt. 8, diam. 9.6 mm. However, even where no size-mark is given in the *Thesaurus*, the figures of many small species are slightly enlarged. Thus, on the same plate with *H. japonica*, the figures of *H. convexa*, *concinna*, etc., are enlarged, while those of some other species are not so. Therefore the dimensions of these figures cannot be relied upon as showing the true size of *H. japonica*. The specimens before me from Tobishima, the type locality, measure alt. 6, diam. 8 mm., or are a little smaller, alt. 5, diam. 7.2 mm. The surface is glossy or dulled by slight erosion, and is rather *finely but deeply striate*. The lip is expanded and in fully adult shells is duplicate, and very much thickened on the face. The moderately thick basal callus is densely, conspicuously roughened. The specimens from Sado are like those of Tobishima, but of a dull red-brown color. A larger race, diam. 9.5 to 10.5 mm., red, or sulphur-yellow, glossy and handsome, occurs at Kashima, Harima. It has the fine sculpture of typical *japonica*.

H. reinii Kobelt, described as a variety of *H. japonica*, is much larger, alt. 10, diam. 14 mm. The type locality is unknown, but

specimens exactly typical occur at Ibuki, Omi. It is much less striate than *japonica*. In the specimens I have seen the surface is dull from loss of the cuticle, which is evidently deciduous and very thin. It varies in color from white or sulphur-yellow to deep crimson. Some shells from Kotsuzan, Awa (Shikoku) having all other characters of *reinii*, have the last whorl covered with glossy cuticle like the small form *expolita*. *Reinii* may prove to be specifically distinct from *H. japonica*, and for the time being may be so considered.

The various forms may be tabulated thus:

- I. Shell distinctly striate or costulate (*H. japonica*).
 1. Striation close and fine.
 - a. Diam. 7 to 8 mm., typical *H. japonica*.
 - b. Diam. 9 to 11 mm., *H. japonica*, var. from Harima.
 - c. Diam. 15 to 16 mm., *H. japonica* var. *uzenensis*.
 2. Very coarsely ribbed; diam. 10–11 mm., *H. japonica* var. *echigoensis*.
- II. Surface not distinctly striate (*H. reinii*).
 1. Surface dull, denuded of cuticle; diameter 12 to 15 mm., typical *H. reinii*.
 2. Surface covered with a smooth, polished cuticle; diam. 10 to 13 mm., *H. reinii* var. *expolita*.

H. j. echigoensis is a new variety from Omimura, Echigo, types no. 84384, A. N. S. P., from no. 575a of Mr. Hirase's collection. It is strongly and coarsely ribbed.

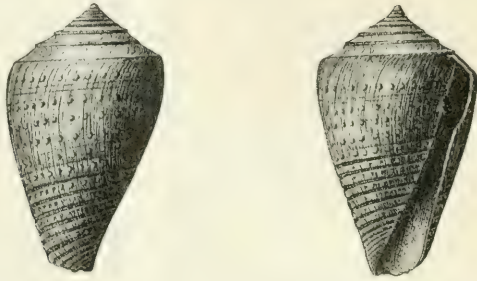
A NEW CONUS FROM THE TERTIARY OF FLORIDA.

BY T. H. ALDRICH.

Conus waltonensis n. sp.

Shell medium in size, substance rather thin; spire elevated, with nine whorls, including the apex, which is rather sharp, profile of spire slightly broken by a shoulder just above the suture on each whorl, the suture impressed, each whorl of the spire concave, and marked by numerous curved lines; periphery sharp; body whorl below the keel in some specimens over one-half smooth, then below this bearing two or three spirals of evenly-spaced nodules without any grooves between, gradually changing to rows of nodules on bands

between grooves, which are eight or ten in number, the nodules fading away as the canal is reached, but in the type specimen the nodules are present over the whole of the smooth part without, however, any grooves between. Anal notch rather deep, and marking the spire



with its former positions; outer lip thin, pillar lip straight with a very slight twist; aperture straight above, widening near the base.

Length 20 mm., max. diameter 12 mm.

Locality: Shoal Creek, Walton county, Florida.

Remarks: This shell bears a close resemblance to *Conus puncticulatus* Hwass, and is doubtless an ancestral form, thus adding another link to the chain of evidence of a connection between the Atlantic and Pacific Oceans during Tertiary times.

This species has been in my possession for many years and until lately was not known to me from any other locality, but on looking over some specimens of fossils from the Number 2 well of the Mobile Oil Co., bored near Mobile, Alabama, I found two or three specimens of it, and from its position over three hundred feet above the Oak Grove (Fla.) horizon in this well, it would seem to indicate that this deposit on Shoal Creek is much younger than the Oak Grove beds. The assignment of these beds to the Oligocene must, in the writer's opinion, be better substantiated than at present. There are so few species common to the "Chipola" of Dall and the Vicksburg formation, it would seem better to confine the use of the term "Oligocene" to the latter, which is in accordance with Conrad's original diagnosis, and put the Chipola, Shoal Creek and Chattahoochie beds into one formation, calling them all Miocene, and if this should eventually be done, then this formation should bear the name its discoverer, D. W. Langdon, Jr., gave it of "Chattahoochie."

D. G. Harris figures a *Conus puncticulatus* Hwass from the Galveston deep well. It is probably the same species as the one herein described. The pustules on the living shell appear to be in the grooves while on the fossil form they are between them.

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No. 12.

MOLLUSKS OCCURRING IN SOUTHERN CALIFORNIA.

The following species, not heretofore made known as occurring in Southern California, have been detected in Los Angeles and elsewhere in this part of the State within the past two years. The large slug *Limax maximus* first observed in the southeasterly part of Los Angeles, has been quite numerous. It is found in considerable abundance in many localities in the Walnut Grove Tract, including my own grounds. Its color caused me to doubt its identity, so I sent specimens to Dr. Pilsbry. He referred them to the foregoing species with the comment, "that it was not the common form, but a melanistic variety which I have never seen from the East." Another slug determined by Dr. Pilsbry for Mr. Williamson is *Limax flavus*, occurring in Los Angeles, apparently rare as yet. In March, last year, I detected a few examples of *Punctum conspectum* Bland, on my lawn near the water faucet; some 9 or 10 specimens; these were named by Professor Dall. I have failed to find further examples after careful search. *Vallonia pulchella*, so exceedingly abundant on my grounds in August, 1900 (see the NAUTILUS, Vol. XIV, pp. 65-67) is now quite scarce.

Mr. Hemphill reports *Limax maximus* as occurring in San Diego in the nursery of the well known florist, Miss Kate O. Sessions of that city.

The appearance and disappearance of forms like *V. pulchella* and *P. conspectum* is not easily explained.

Helix aspersa became exceedingly abundant on my premises, so numerous as to be a pest; by persistent search it is now nearly ex-

terminated. The hunt will have to be kept up, else it will soon become as abundant as ever.

ROBT. E. C. STEARNS.

Los Angeles, Feb'y 24, 1903.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Chloritis tosanns n. sp.

Shell umbilicate, depressed, the spire but slightly convex, very thin, uniform brown. Surface slightly glossy, closely set with short hairs arranged in regular oblique rows. Whorls $4\frac{3}{4}$, very convex, separated by a deeply excavated suture, the last whorl rounded peripherally and beneath. Aperture slightly oblique, rounded-lunate; peristome thin, acute and not expanded except at the columellar insertion, where it is widely dilated, partly covering the umbilicus. Alt. 10, diam. 17.5 mm.

Shinjo-mura, Tosa. Type no. 84415. A. N. S. P., from no. 1015 of Mr. Hirase's collection.

This species is the first *Chloritis* found in Shikoku. It is very like *C. perpunctatus*, but about twice the size. In *C. fragilis* the hairs are much more widely spaced. *C. hirasei* is far more widely umbilicate.

Eulota (Cælorus) cavitectum n. sp.

The shell resembles *E. caviconus*, but is larger, not quite so high, the umbilicus contracting more rapidly within. Brown; covered with oblique cuticular threads and small scales, the scales predominating on the last whorl and base. Whorls $6\frac{1}{3}$, slightly convex, the last strongly carinate at the periphery, a little convex beneath, descending rather deeply below the keel in front. The aperture is nearly horizontal, transversely oval. The peristome is brown, thin, the upper margin not expanded, lower margin reflexed, bearing a white tubercle on the inner margin. Alt. 5, diam. 10 mm.

Kochi, Tosa. Type no. 84416. A. N. S. P., from no. 1033 of Mr. Hirase's collection.

E. caviconus of western Kyushu is smaller, has more whorls, a well-like umbilicus, and finer sculpture, the cuticle of *E. cavitectum*

being roughened like that of a *Plectotropis*. It is the first *Cælorus* found in Shikoku Island.

Trishoplita lischkeana var. *hizenensis* n. var.

The shell is transparent-whitish, with a red-brown band at the periphery, which is angular in front, becoming rounded on the latter part. The band ascends above the suture. The surface is glossy, and under the lens is seen to be very finely striate, and decussate by very close, fine, shallow spiral striæ. Whorls $4\frac{1}{2}$. The umbilicus is about one-eighth the diameter of the shell. Peristome thin, expanded below, hardly so above.

Alt. 5.8, diam. 9 mm.

Alt. 5.3, diam. 8.8 mm.

Ukujima, Hizen. Types no. 84414. A. N. S. P., from no. 1019 of Mr. Hirase's collection.

This little shell has the red-brown band and decussate surface of the much larger shell I described as *T. collinsoni* var. *okinoshimæ* (Proc. Acad. Nat. Sci., Phila., 1901, p. 547. It is also related to *T. c.* var. *casta* (NAUTILUS XV, p. 19), also a larger shell, from the province Hiuga, in eastern Kyushu; and to *T. lischkeana* (Kobelt), from Iiagi, Nagato, on the northwestern coast of southwestern Hondo (Nippon). *T. lischkeana* is more elevated than *hizenensis*, and though compressed, the last whorl is not angular. Otherwise the two forms seem to be alike, so far as we can tell from the published description and figures of *lischkeana*.

One of the present authors, in referring these forms to *A. Adams collinsoni* some years ago (NAUT. XV, 19), was influenced by the belief that the locality "Tago" given for that species was situated in western Shikoku but this was an error, Tago being a seaport of the province Izu, on Suruga Gulf; and as *collinsoni* is described as a decidedly more globose shell than *casta*, etc., though similarly colored, it will probably prove to be specifically distinct from the forms *casta* and *okinoshimæ*.

Trishoplita mesogonia var. *shikokuensis* n. var.

The shell is similar in form to *T. mesogonia* (Pils.), but differs in sculpture, being very closely and finely striate spirally. The types are red-brown, fading towards the suture and base, with a pale line at the angular periphery, and more or less streaked with whitish-corneous. Whorls $5\frac{1}{2}$. Alt. 7.3, diam. 11 mm.

Sodayama, Tosa. Types no. 84412. A. N. S. P., from no. 1016 of Mr. Hirase's collection.

T. mesogonia is from the province Tango in western Hondo, Hilizan on the western side of Lake Biwa, etc. It varies from reddish-brown to nearly as pale as *T. goodwini*. The variety from Shikoku is similar in shape, but constantly different in sculpture. The types are variegated as described above. A series from Kochi, Tosa (Mr. Hirase's no. 580), has neither the pale peripheral band nor the streaks of the shells from Sodayama, and varies from pale brown to nearly as light a tint as *T. goodwini*. Specimens of this lot were compared by Mr. Gude with his *T. goodwini* var. *carinata*, and said to "differ in the body-whorl, and the aperture is smaller and more rounded." Others were found at Suimura, Awa (Shikoku), Mr. Hirase's no. 823, like the Kochi lot.

Arinia japonica n. sp.

The shell is very minute, gray, cylindric, terminating above in an *extremely short, low brownish cone* of hardly two whorls. Surface lusterless, sculptured with narrow ribs, like a *Diplommata*. These ribs are fine and rather close, but on the last whorl they become *very widely spaced*. Whorls $5\frac{1}{3}$, convex, the last whorl distorted, being smaller than the preceding whorl, and strongly ascending in front. It is very shortly and inconspicuously rimate. The aperture is vertical and circular. The peristome is continuous; very narrowly expanded, and thickened outside behind the edge. The columella is simply concave. Length 2, diam. 1.2 mm.

Goto, Hizen. Types no. 84413. A. N. S. P., from no. 1018 of Mr. Hirase's collection.

This tiny snail is the first *Arinia* from Japan, and by far the most northern of its kind. It is remarkable for the very obtuse summit.

ILLUSTRATIONS OF SOME JAPANESE LAND SHELLS.

Several of the Japanese snails described in the NAUTILUS during the past year or two are illustrated on the plate accompanying Mr. Hirase's catalogue of Japanese shells inserted in our advertising pages this month. As some of them have not before been figured, it seems proper briefly to refer to them.

The *Euhadra* section of *Eulota* is represented by two fine species. Fig. 3 is *E. callizona* var. *dixonii* Pils. (NAUTILUS XIV, p. 60). This elegant shell is from the province Idzumo. It is named for the President of the Academy of Natural Sciences. Fig. 4, *E. senckenbergiana* var. *awaensis* Pils., is a race from Shikaku of the species from western Japan, the largest Japanese Helix. Figs. 5, 6, *Plectotropis elegantissima* var. *cara* Pils. (NAUTILUS for Jan., 1901, p. 107) is from Great Riukiu Islands.

Ganesella Pargillierii Phil., from the same island (fig. 13), is a very characteristic Riukiu snail; and fig. 1, *G. myomphala* Mart., is the largest Japanese member of the same genus, and to my eye, one of the most beautiful Helices. It is rather widely distributed in southern Japan.

Clausilia martensi var. *reiniana* Kob., is the largest living *Clausilia*. It is not an uncommon species in central Japan.

Cyclophorus hirasei Pils. and *Pupinella oshimæ* Pils. are two operculate forms from the island of Oshima, in the "Riukiu Curve."

Figs. 7-10 belong to the wonderful fauna of the Bonin Islands (Ogasawara-jima). These mere dots on the great Pacific have a varied snail population of about 50 species, all but half a dozen discovered by Mr. Hirase's collectors, chiefly by Mr. Nakada, whose work is deserving of high praise. Fig. 7 is the var. *trifasciata* of *mandarina mandarina* Gray, from Nakanojima, a little islet not shown on ordinary maps. The genus *Mandarina* comprises a half dozen species, the largest, *M. ruschenbergeriana* Pils., NAUTILUS IV, p. 64, figs. in text, exceeding our big *Polygyra chilhoweensis* in size. It was supposed before Mr. Hirase's explorations, to be from the Riukiu Is. The species of *Mandarina* are all from the Bonin Is., and are strong, solid shells, related to a Chinese group of which the common *Camæna cicatricosa* is a well-known member. Fig. 8 is *Fumetesta mirabilis* Pils., from Habajima, the southern large island of the Ogasawara group. The name "wonderful starved shell" is from its lank, emaciated appearance. *Hirasea profundispira* Pils., fig. 9 (NAUTILUS XVI, p. 47), is one of the numerous genus *Hirasea* (NAUTILUS XV, p. 118), consisting of small shells very peculiar in shape. *Hirasiella clara* Pils., fig. 10 (NAUTILUS XV, April, 1902), is the sole representative of a related genus. These genera are all confined to the Ogasawara-jima.

HABITS OF ACANTHOPLEURA GRANULATA.

BY S. H. HAMILTON.

The south coast of Cuba west of Santiago de Cuba is a sharp, dock-like escarpment bounded by very deep water. In the cavities of the coralline rock, from ebb water to that just wetted by each wave, are the homes of this chiton. The impact of the waters of the Caribbean against this coast, not being broken by any beach or shallow water, is often very powerful and destructive. I observed that with each successive wave the chitons brought their girdles flush and tight with the rocks, while during slack water they raised, so as to let the receding fluid circulate freely around their gills. At the time of my visit to Cuba I was unacquainted with the visual organs of the tegmentum, and supposed that *Acanthopleura granulata* had acquired a rhythmic movement by experience and was so enabled to live in a more exposed situation than other mollusks. It now seems evident to me that the megalapores are so well developed in this species that it can perceive the oncoming wave before it strikes.

TEMPLE PRIME.

In the death of Temple Prime, which occurred on the 25th of February last, another of the old-time Conchologists has passed away. Mr. Prime was born in New York City seventy years ago, and after graduating at Harvard, studied law but never practised. He was greatly interested in science, particularly Conchology, and studied with Professors Agassiz and Silliman. In the early sixties he published numerous papers, mostly in the Proceedings of the Acad. Nat. Sciences, Philada., upon the *Cyclades*, in which he was especially interested and an authority. His exhaustive Monograph of the Corbiculidæ was published under the auspices of the Smithsonian Institute, Washington.

Mr. Prime was also a student of Genealogy and History, and at the time of his death was at work on a French history. He was actively interested in political affairs, being what is called an Independent, and in 1860 was secretary of legation at The Hague, Holland. As president of the Citizens' League for good government in Huntington, he took a lively interest in local affairs and was a large con-

tributor towards its educational and other interests, notably the Soldiers and Sailors Memorial Association, the indebtedness of which he greatly reduced and finally cancelled.

Personally Mr. Prime was a generous friend, ever ready to help any worthy cause with purse or counsel, and he will be greatly missed in the community in which he spent so many years of his life.

S. RAYMOND ROBERTS.

PUBLICATIONS RECEIVED.

SYNOPSIS OF THE FAMILY VENERIDÆ AND OF THE NORTH AMERICAN RECENT SPECIES. By Wm. H. Dall (Proc. U. S. Natl. Mus. xxvi, 335-412, plates xii-xvi, 1902).

This synopsis gives in condensed form the results of another of Dr. Dall's elaborate studies on the Pelicypods. The revision of the nomenclature involved a great amount of work, necessitating many generic and specific changes. A complete bibliography is given, followed by the synopsis of classification of the genera and subgenera, and a revision of the species with descriptions of twenty new species.

Dr. Dall divides the *Veneridæ* into four sub-families: *Dosiniinæ*, *Meretricinæ*, *Venerinæ*, *Gemminæ*; represented on the Atlantic coast by 59 species, and on the Pacific by 80 species, two being natives of both oceans.

From the Atlantic and Gulf coasts of the United States the following species are recorded: *Dosinia concentrica* Born.; *D. elegans* Con.; *D. discus* Rve.; *Transennella cubaniana* Orb.; *T. stimpsoni* Dall; *T. conradiana* Dall; *Gouldia cerina* C. B. Ads. is now placed in the genus *Gafrarium* Bolten 1798, and *Macrocallista nimbosa* Solander 1786, is adopted in place of *Callista gigantea* Gmel. 1792; *M. maculata* L.; *Callocardia* (*Agriopoma*) *morrhuanæ* Linsley, replaces *Cytherea convexa* Say (not Brong.), and *C. sayana* Con., the two latter names were applied to the Miocene form which is considered distinct from the recent. *Callocardia texasiana*, Dall; *C. zonata* Dall; *Pitaria albida* Gmel.; *P. fulminata* Mke. (*Cytherea varians* Hanley); *P. simpsoni* Dall; *P. eucymata* Dall, and *P. (Hysteroconcha) dione* L. The latter is more familiarly known as *Dione dione* or *D. veneris* Desh. By elimination the genus *Cytherea* Bolton 1798 should be restricted to form like *C. listeri* Gray (*Venus*

crispata Desh.), *C. rigida* Dillw. 1817 (*V. rugosa* Gmel. 1772, not Linn. 1771), *C. rugatina* Heilp. and *C. strigillina* Dall. *Cyclinella tenuis* Recl. (*Lucinopsis tenuis*); *Chione cancellata* L. (*Venus cancellata*), *C. subrostrata* Lam. (*V. beauri* Recl.), *C. mazyckii* Dall; *C. intapurplea* Conr.; *C. grus* Holmes; *C. pygmaea* Lam.; *C. paphia* L.; *C. latilirata* Conr. (*V. varicosa* Sowb.); *Anomalocardia brasiliiana* Gmel. (*Venus flexuosa* Born, not Linn., and *V. macrodon* Hanley are syn.) *A. cuneimeris* Conr. (*V. rostrata* Sowb.); *Venus mercenaria* L.; *V. campechiensis* Gmel. (*V. murtoni* Conr.), *Liocyma fluctuosa* Gould; *Gemma gemma* Tott.; *G. purpurea* H. C. Lea (*G. concentrica* Dall.), and *Parastarte triquetra* Conr.

From the Pacific coast north of Mexico the following are received: *Dosinia ponderosa* Gray (Pleistocene only, on the California coast), *Transennella tantilla* Gld.; *Tivela* (*Pachydesma*) *stultorum* Mawe. (more familiarly known as *Pachydesma crassatelloides* Conr.), *Amiantis callosa* Conr.; *Pitaria newcombiana* Gabb.; *Cytherea fordii* Yates; *Saxidomus nuttallii* Conr.; *S. gigantea* Desh.; *Chione fluctifraga* Sowb.; *C. undatella* Sowb. (*V. simillima* Sowb.); *C. succincta* Val.; *Venus kennicottii* Dall; *Marcia kenneleyi* Rve.; *M. subdiaphana* Cpr.; *Paphia* (*Protothaca*) *staminea* Conr. The genus *Paphia* Bolton 1798, replaces *Tapes* Megerle 1811, the latter is however used as a sub-genus. Five varieties of *P. staminea* are recognized *Petiti* Desh. (*rigida* Gould); *luciniata* Cpr.; *runderata* Desh.; *orbella* Cpr., and *sulculosa* Dall. *P. tenerrima* Cpr.; *Liocyma beekii* Dall; *L. viridis* Dall; *L. scammoni* Dall; *Venerupis lamellifera*, *Psephidia lordi* Baird (*Psephis lordi*), *P. ovalis* Dall, and *Gemma gemma* Ton., the latter introduced into San Francisco Bay on "seed" oysters.

A number of forms on the Pacific coast are closely related to species of the Atlantic fauna, and probably had a common ancestry when the two oceans were connected at the isthmus. *Dosinia ponderosa* "recalls somewhat the Atlantic *D. concentrica*;" *Tivela byronensis* Gray (*T. radiata* Sowb.), is "the analogue of *T. macroloides* Born of the Antilles;" *Macrocallista squallida* Sowb., is the analogue of *M. maculata* of the Atlantic fauna, and *Callocardia catharia* Dall, is represented in West Indies by *C. aresta* Dall and Simpson; *Pitaria tomeana* Dall is "the apparent analogue of *P. fulminata* of the Atlantic fauna." *P. (Hysteroconcha) lupanaria* Less. is "a larger but less elegant analogue of the Antillean *P. dione* L., easily recognized by the violet spots at the base of the spines;"

P. (Lamelliconcha) circinata of the Atlantic can hardly be separated from *P. alternata* of the Pacific; *Cytherea magdalenæ* Dall is the analogue of *C. strigellina* Dall, of the Atlantic fauna; *C. rigida* Dillw. is found on both shores; *C. multicosata* Sowb. is allied to *C. listeri*; *Chione subrostrata* lives on both coasts; forms of *C. undatella* often resemble *C. cancellata*; *C. purpurissata* Dall is closely related to *C. puber* Val.; *C. pulicaria* is the analogue of *C. intapurpurea* of the Atlantic fauna; while *C. obliterated* Dall "is the analogue of *C. latilirata* Conr., and *C. mariæ* Orb. of *C. paphia* L."—C. W. J.

REVISION DES CYPRÆIDÆ DE LA NOUVELLE-CALÉDONIE, par Ph. Dautzenberg, Journal de Conchyliologie, Vol. L, pp. 291–384, 1902. In this interesting paper the author records about 70 species, and a number of varieties including several which are described as new. The following is a brief review of the new forms:

CYPRAEA ARGUS var. MINOR, applied to specimens under 55 mm. in length.

C. ARGUS var. CONCATENATA, shells with numerous small ocellated spots disposed in small chains, which cross each other more or less regularly; at the points of intersection the remarkably large rings sometimes transform into brown spots.

C. CARNEOLA var. PROPINQUA Garrett (Cat'l *Cypræidæ*), very short, reflected, approaching in form *C. arenosa*, dorsal region with a violet ring more or less apparent.

C. TALPA var. SATURATA. In this variety the three dorsal bands are less clearly defined, the entire shell being tinted with a deep brown.

C. TABESCENS. *C. rashleighana*, *C. alveolus*, and *C. elaiodes* are all considered varieties of *C. tabescens*.

C. CAURICA var. PALLIDA. This has the form of var. *obscura* Rossiter, but tending to albinism, while var. *obscura* tends to melanism.

C. ARABICA var. ATRA. Tinted with black over the entire dorsal surface. This var. corresponds to the var. *nigricans* of *C. eglatina*.

C. EGLATINA var. PALLIDA. Based on two shells with very marked tendencies to albinism.

C. HISTRIO var. LUCTUOSA. This presents exactly the same ex-

tent of melanism as the var. *nigricans* of *C. eglatina*, but without a tendency to rostration.

C. TIGRIS var. *ROSSITERI*. Is characterized by the dorsal surface being a beautiful orange, the scattered brown spots being few in numbers.

C. VITELLUS var. *SUBROSTRATA*. Based on a specimen showing a tendency to rostration.

C. ERRONES L. Under this species three varieties are recognized, var. *ovum* Gmel.=*sophiæ* Brazier, a color var. *albida*, entirely white except for light spots of brown on each side of the extremities, var. *pallidior*, with dorsum very pale, base recurved, callus very thick, white, without spots at the extremities.

C. WALKERI var. *ROSSITERI* is based on *Luponia bregeriana* Rossiter (1882) not Crosse (1868).

C. ZICZAC var. *DECOLORATA*. Specimens tending to albinism. *C. miliaris* Gmel. and *C. eburna* Barnes are both considered varieties of *C. lamarecki*; but in uniting these forms why make *C. lamarecki* Gray 1824 the species and *C. miliaris* Gmel. 1790 a variety?

C. PORARIA var. *INSIGNIS* is unusually shining or seemingly translucent, dorsal region orange, without spots, base beautifully tinged with violet.—C. W. J.

BIOMETRIKA, a new journal for the statistical study of biological problems (Cambridge, England) contains several papers on mollusks. In vol. 2, part 1 (Nov., 1902), Miss Abigail C. Dimon has studied at length the variation and correlation of *Nassa trivittata* and *obsoleta* from Cold Spring Harbor, Long Island. She discusses the influence of density and stillness of water on depauperization. Both species were found at that locality to be smaller than normal type, this being attributed to lack of density of the waters of Long Island Sound as compared with the open ocean. While this explanation may apply to *N. trivittata* which is a snail inhabiting open beaches, it is certain that the small size of *N. obsoleta* is not thus to be explained, because this is a species of the salt meadows and inlets, and the largest individuals we have ever collected were taken in a stream in a mud-flat, which ran fresh at low tide, and being far from the open ocean, could not have been very dense when submerged at high tide. There is great need for improved mechanical devices for rapidly determining quantitatively the various characters both of form and

color in shells. We do not see much use in carrying the decimals of mm. to two or more places in measuring the length of shells of the size of these, but then it does no great harm if the measurer has plenty of time. There is a wide field for this kind of work among our mollusks, and the data to be obtained are of great value.—H. A. P.

Part 4 of Vol. I of the same journal contains a valuable statistical investigation by C. Hensgen on the band variations of *Helix nemoralis*, at several places in Strasburg. The paper is too extensive for abstract, but it may be mentioned that the curve for number of bands has its major mode at 0 with a well-marked minor mode at 3 bands.—H. A. P.

GENERAL NOTES.

CONUS PROMETHEUS Hwass.—A synonym of this species which I have not seen noticed in the monographs is *Conus nicholii* Wilson, 1831; figured in James Wilson's "Illustrations of Zoölogy," pl. 36. The specimen described measured $8\frac{1}{2}$ inches long.

In the revision of the CARDITACEA, lately printed by the Academy of Natural Sciences, I preserved the name *Miodon* for a form of *Venericardia* found on the Pacific coast and applied by Carpenter in 1864. For *Miodon* Sandberger, 1870, given to a fossil form of *Cyrena* the name *Miodontopsis* was proposed. In Sharp's Index Zoologicus just received, I find *Miodon* however was used for an ophidian in 1859 by Duméril, and therefore Carpenter's shell will have to have a new name also. In this case I would propose *Miodontiscus* for the Venericardian.—W. H. DALL.

Mr. Jas. H. Ferriss and the senior Editor of the NAUTILUS are collecting mollusks and ferns in the Southwest.

So many years have elapsed since a general work covering the entire mollusca has appeared, that it is of interest to many readers of THE NAUTILUS who have not access to the larger libraries to know what are the general views of leading biologists regarding the relative

position of the larger groups. This feature is very clearly shown in an excellent "Manual of Zoölogy," by Richard Hertwig, recently translated by Prof. J. S. Kingsley. "This American edition is not an exact translation. With the consent of the author, the whole text has been edited and modified in places to accord with American usage."

The Mollusca (Phylum VI) are divided into five classes, of which the *Amphineura*, including two subclasses, *Placophora* (Chitons) and *Aplacophora* are considered the most primitive. Class II comprises *Acephala* or *Pelecypoda*, in which the views of Pelseneer are closely followed. The order *Protoconchix* includes most of the families grouped by Dr. Dall under *Prionodesmacea*, except the *Naiadæ*, which, with the remainder of the families, are placed in the order *Heteroconchix*. The *Nuculidæ* are considered the most primitive, while the more highly specialized families, like the *Teredidæ* and *Gastrochænidæ*, are placed at the other extreme. *Scaphopoda* (Class III) are placed between the *Pelecypoda* and *Gasteropoda*; the latter being divided into three orders: *Prosobranchia*, *Opisthobranchia* and *Pulmonata*. The *Prosobranchs* are divided into two suborders: *Aspidobranchia*—of which the *Docoglossa* (Limpets) are the most primitive—and the *Pectinibranchia*. *Heteropoda* "in all details of gills, genitalia, heart and nervous system are true *Pectinibranchi*, but from an exclusively pelagic life have acquired peculiar modifications." The *Opisthobranchia* consists of three suborders: *Tectibranchia*, *Pteropoda*—"pelagic forms which in most points of structure agree with the *Tectibranchi*"—and *Nudibranchia*. Class V comprises the *Cephalopoda*.—C. W. J.

The junior editor of the NAUTILUS has been appointed Curator of the Boston Society of Natural History, Boston, Mass. This will be his future address.

ERRATA.—In the article "Notes on *Pyramidula elrodi* Pils." in the February NAUTILUS, McDonald Lake of the Mission Mountains should be read instead of Post Lake. There are two McDonald Lakes in Montana, and the authorities seem to think the same name for two lakes within a hundred miles of each other must stand.—M. J. ELROD.

CATALOGUE

OF

LAND SHELLS OF JAPAN

TO BE HAD OF

Y. HIRASE

SHIMOCHOJA-MACHI,
KARASUMARU, KYOTO, JAPAN.
1903.

HAVING collected Japanese land, fresh-water and marine shells for many years, the number of species in my possession has now reached several thousand. Among these are many new species, found by myself and my assistants. In the land shells especially, the new species outnumber those known before my researches began.

With the aid of numerous assistants I have been able to explore many parts of Japan, including the Riukiu (Loo-choo) Islands, and the Ogasawara (or Bonin) group, where a rich fauna of new and strange land shells was found. I hope in future to extend the work, and send collectors to China, Corea and Formosa.

All the species are sent to Dr. Pilsbry, of Philadelphia, U. S. A., who kindly determines them, so that I believe that those receiving specimens from me may place confidence in the names, and will find them an important and useful addition to their collections.

Attention is called to the importance of securing *authentic specimens from the original localities* of the many new species in my collections.

Catalogues of marine and fresh-water shells are in preparation.

Specimens will be sent on approval to purchasers known to me or giving satisfactory reference.

Y. HIRASE.

CATALOGUE OF LAND SHELLS,

TO BE HAD OF

Y. HIRASE,

SHIMOCHOJA-MACHI, KARASUMARU, KYOTO, JAPAN.

NOTE.—Species and varieties marked thus * are new forms, described from specimens from my collection. Where no prices are given, specimens are not always in stock.

ACMELLA.

- | | | | |
|------|---------------|----------------------|------------|
| *853 | vagans, Pils. | Hahajima, Ogasawara, | \$0.08-.12 |
| *856 | minima, Pils. | Hahajima, Ogasawara, | .07-.10 |

ALYCAEUS.

- | | | | |
|-------|--------------------|--------------------------|---------|
| *831b | biexcisus, Pils. | Suimura, Awa. (Shikoku), | .05-.08 |
| *298 | harimensis, Pils. | Kashima, Harima, | .05-.08 |
| *996 | harimensis, var. | | |
| | sadoensis, P. & H. | Aikawa, Sado, | |
| *476 | hirasei, Pils. | Kyoto, Yamashiro, | .04-.07 |
| *499 | melanopoma, Pils. | Mikuriya, Suruga, | .04-.07 |
| *298b | reinhardti, Pils. | Kashima, Harima, | .05-.08 |
| *704 | satumanus, Pils. | Kagoshima, Satsuma. | |
| *723 | tanegashimæ, Pils. | Tanegashima, Osumi. | |
| *916 | vinctus, Pils. | Tanegashima, Osumi. | |

AURICULA.

- | | | | |
|-----|----------------|----------------|---------|
| 442 | reiniana, Kob. | Hirado, Hizen, | .07-.12 |
|-----|----------------|----------------|---------|

BIFIDARIA.

619	armigerella, Reinh.	Yaeyama, Loochoo,	.05-.08
*798	ogasawarana, Pils.	Chichijima, Ogasawara.	
*797	chichijimana, Pils.	Chichijima, Ogasawara.	
757	plicidens, Benson.	Riozen, Omi.	

BLANFORDIA.

412	bensoni, A. Ad.	Shikunobe, Ojima,	.03-.05
*406	simplex, Pils.	Nishigo, Uzen,	.03-.05
990	japonica, A. Ad.	Sotokaifu, Sado.	

BULIMINOPSIS.

621	meiacoshimensis,		
	A. Ad. & Rve.	Yaeyama, Loochoo,	.07-.12
*455	turrita, Gude.	Loochoo,	.05-.08

BULIMINUS.

311	andersonianus,		
	Mlldff.	Shikunobe, Ojima,	.06-.10
*750a	andersonianus, var.		
	echigoensis, P. & H.	Myokozan, Echigo.	
*468	callistoderma, Pils.	Hahajima, Ogasawara,	.05-.08
*758	callistoderma, var.		
	hachijoensis, Pils.	Hachijo, Izu.	
*602	callistoderma, var.		
	ogasawarae, Pils.	Hahajima, Ogasawara,	.08-.15
*597	eucharistus, Pils.	Yaeyama, Loochoo.	
*478	hirasei, Pils.	Kikai, Osumi,	.08-.12
919	hiraseanus, Pils.	Hahajima, Ogasawara.	
*598	luchuanus, Pils.	Yaeyama, Loochoo.	
*930	luchuanus, var.		
	oshimanus, Pils.	Oshima, Osumi.	
509	reinianus, Kob. v.	Shirakata, Sanuki.	
582	reinianus, Kob.	Arakura, Tosa,	.08-.12
587	reinianus, Kob.		
	(small var.)	Okinoshima, Tosa.	
549	reinianus, var.		
	extorris, Branc.	Kyoto, Yamashiro,	.06-.10

- *411 *reinianus*, var.
 hokkaidoensis, Pils. Shikunobe, Ojima, .12-.20
 *484 *reinianus*, var.
 omiensis, Pils. Ibuki, Omi, .08-.12

CARYCHIUM.

- *618 *cymatoplax*, Pils. Yaeyama, Loochoo, .05-.08
 *946 *hachijoensis*, Pils. Hachijojhima, Iza.
 555 *noduliferum*, Reinh. Nishigo, Uzen, .04-.07
 *729 *pessimum*, Pils. Tanegashima, Osumi, .06-.10

CASSIDULA.

- 445 *labrella*, Desh. Hirado, Hizen, .03-.05

CHLORITIS.

- *958 *albolabris*,
 Pils. & Hir. Yakushima, Osumi.
 *354 *eucharistus*, Pils. Oshima, Osumi, .25-.40
 *981 *echizenensis*,
 Pils. & Hir. Omushi, Echizen.
 *13 *fragilis*, Gude. Kyoto, Yamashiro.
 *786 *hirasei*, Pils. Kurozu, Kii.
 *843b *perpunctatus*, Pils. Totsugawa, Yamato.
 *735 *pumila*, Gude. Mikuriya, Suruga.

CLAUSILIA.

- 424 *addisoni*, Pils. Kagoshima, Satsuma, .05-.08
 *663c *agna*, Pils. Yakushima, Osumi.
 *1014 *aenea*, Pils. Tosa.
 501 *attrita*, Bttg. Ibuki, Omi, .05-.08
 *764b *attrita*, var. in-
 fausta, Pils. Tomisato, Kii, .07-.10
 *1013 *aratorum*, Pils. Tosa.
 *450b *aulacophora*, Pils. Fukura, Awaji, .05-.08
 *733b *aulacopoma*, Pils. Hirado, Hizen, .06-.10
 503 *aurantiaca*, Bttg. Nohara, Yamato, .05-.08
 738 *aurantiaca*, var.
 erberi, Bttg. Gojo, Yamato, .05-.08
 782 *aurantiaca*, var.
 plicidens, A. Ad. Kashima, Kii, .05-.08

*450a	awajiensis, Pils.	Fukura, Awaji,	.05-.08
*818	bigeneris, Pils.	Goto, Hizen.	
254	bilabrata, Smith.	Senzan, Awaji.	
*1002	bilabrata, var.		
	tosaensis, Pils.	Shiujomura, Tosa.	
593	brevior, Mart.	Oshima, Izu,	.05-.08
*634	callistochila, Pils.	Kunchan, Loochoo.	
*894	caloptyx, Pils.	Yakushima, Osumi.	
*770c	caryostoma, var.		
	jayi, Pils.	Jomura, Kii.	
434c	caryostoma, Mlldff.	Banzai, Awa.	
*306b	comes, Pils.	Kashima, Harima,	.06-.10
*632a	crenilabium, Pils.	Kunchan, Loochoo,	.08-.12
*632b	crenilabium, Pils.		
	(var.)	Kunchan, Loochoo.	
*874	dæmonorum, Pils.	Kikai, Osumi.	
*819	dalli, Pils.	Tairiuji, Awa (Shikoku),	.07-.10
410a	digonoptyx, Bttg.	Nishigo, Uzen,	.05-.08
739a	ducalis, Kob.	Miyamura, Hida,	.10-.15
*913a	ducalis, var.		
	decapitata, Pils.	Kashima, Harima.	
740	ducalis, var.		
	dorcas, Pils.	Miyamura, Hida,	.10-.15
*765b	ducalis, var.		
	mediocris, Pils.	Tomisato, Kii.	
*986	echigoensis, Pils.	Myokozan, Echigo.	
*663a	entospira, Pils.	Tanegashima, Osumi.	
*563	euholostoma, Pils.	Mikuriya, Suruga,	.07-.10
687	fultoni, Sykes.	Ushirogawa, Tosa.	
*794	graciæ, Pils.	Nachi, Kii,	.07-.10
592	hakonensis, Pils.	Oshima, Izu.	
*306a	harimensis, Pils.	Kashima, Harima,	.06-.10
*764a	heteroptyx, Pils.	Tomisato, Kii.	
*423	hirasei, Pils.	Kagoshima, Satsuma,	.04-.07
*586	hiraseana, Pils.	Okinoshima, Tosa,	.06-.10
*546b	hokkaidoensis, Pils.	Kayabe, Ojima.	
*789	holotrema, Pils.	Nachi, Kii.	
686	hyperolia, Mart.	Oshima, Izu,	.06-.10

*457	hyperptyx, Pils.	Loochoo,	.05-.07
*733	subignobilis, Pils.	Hirado, Hizen,	.05-.07
*486b	iotaptyx, Pils.	Ibuki, Omi,	.08-.12
*292	iotaptyx, var.		
	clava, Pils.	Senzan, Awaji,	.05-.08
*657a	ischna, Pils.	Kioragi, Higo,	.06-.10
*754	jacobiana, Pils.	Tanegashima, Osumi,	.05-.08
56a	japonica, Crosse.	Senzan, Awaji,	.04-.06
198	japonica, Crosse.		
	(large var.)	Takeya, Izumo,	.04-.06
*403	japonica, var. inter-		
	plicata, Pils.	Nishigo, Uzen,	.05-.07
11	japonica, var.		
	nipponensis, Kob.	Kyoto, Yamashiro,	.03-.05
*56e	japonica, var. per-		
	obscura, Pils.	Shirono, Buzen,	.08-.12
*657b	kochiensis, Pils.	Kioragi, Higo,	.08-.12
*934	kurozuensis, Pils.	Kurozu, Kii.	
564	martensi, Herklots.	Mikuriya, Suruga,	.07-.10
500	martensi, var.		
	reiniana, Kob.	Ibuki, Omi,	.07-.10
*768	martensi, var.		
	tinutilabris, Pils.	Nachi, Kii.	.08-.12
737	micropeas, Mlldff.		
	(var.)	Mikuriya, Suruga,	.05-.08
*486a	mikado, Pils.	Ibuki, Omi,	.05-.08
*654	mima, Pils.	Oshima, Osumi.	
*762	mitsukurii, Pils.	Tomisato, Kii,	.10-.15
*546a	monelasmus, Pils.	Kayabe, Ojima,	.05-.08
*646	munus, Pils.	Oshima, Osumi,	.06-.10
*932	neniopsis, Pils.	Oshima, Osumi.	
*652	nesiothauma, Pils.	Oshima, Osumi,	.10-.15
*434	nolani, Pils.	Fukura, Awaji,	.07-.12
463	oostoma, Mlldff.	Mikuriya, Suruga,	.04-.06
*926	oostoma, var.		
	goniopoma, Pils.	Wakayama, Kii.	
*696	oostoma, var.		
	dactylopoma, Pils.	Kashio, Awaji.	

*748	orthatracta, Pils.	Akasaka, Mino.	
*674	oscariana, Pils.	Fukuregi, Higo,	.08-.15
*653a	oshimæ, Pils.	Oshima, Osumi.	
*695	oxycyma, Pils.	Kagoshima, Satsuma.	
*954	pachyspira, Pils.	Miyai, Kii.	
*584	perignobilis, Pils.	Okinoshima, Tosa,	.06-.10
*410b	perpallida, Pils.	Nishigo, Uzen,	.08-.12
*306c	pigra, Pils.	Kashima, Harima,	.06-.10
*663b	pinto, Pils.	Tanegashima, Osumi,	.06-.10
*817	plagiptyx, Pils.	Goto, Hizen.	
473	platyauchen, Mart.		
	(var.)	Nishigo, Uzen,	.05-.08
669	platyauchen, Mart.		
	(small var.)	Mikuriya, Suruga,	.04-.07
502	platydera, var.		
	lambda, Bttg.	Nohara, Yamato,	.05-.08
*763	platydera, var.		
	kiiensis, Pils.	Tomisato, Kii,	.06-.10
*434d	platyderula, Pils.	Aki, Awa.	
*653b	pseudoshimæ, Pils.	Oshima, Osumi.	
*664a	ptychocyma, Pils.	Tanegashima, Osumi,	.08-.12
*664b	ptychocyma, var.		
	yakushimæ, Pils.	Yakushima, Osumi,	.07-.10
*993	sadoensis, Pils.	Misakimura, Sado.	
656	schmackeri, Sykes.	Kochi, Tosa,	.07-.10
987	sericina, Mlldff.	Omimura, Echigo.	
*736b	sericina, var.		
	rhopalia, Pils.	Mikuriya, Suruga,	.08-.15
*506	shikokuensis, Pils.	Ushirogawa, Tosa,	.07-.10
*820	shikokuensis, Pils.		
	(small var.)	Tairiuji, Awa (Shikoku),	.05-.07
*506c	shikokuensis, var.		
	inokuchiensis, Pils.	Inokuchimura, Tosa.	
*345	sieboldi, var.		
	diptyx, Pils.	Hirado, Hizen,	.04-.06
622	stearnsii, Pils.	Yaeyama, Loochoo,	.08-.12
*594	stearnsii, Pils.		
	(small var.)	Loochoo.	

*670	stereoma, Pils.	Yakushima, Osumi,	.08-.12
*661	stereoma, var. cognata, Pils.	Tanegashima, Osumi,	.06-.10
*670a	stereoma, var. hexptyx, Pils.	Yakushima, Osumi.	
*671	stereoma, var. nugax.	Yakushima, Osumi.	
*505	subaurantiaca, Pils.	Toyonishikami, Nagato,	.06-.10
*488	subjaponica, Pils.	Ibuki, Omi,	.05-.08
*766	subulina, var. leucopeas, Pils.	Tomisato, Kii.	
*688	surugensis, Pils.	Mikuriya, Suruga,	.06-.10
*1007	sus, Pils.	Muya, Awa.	
*662	tanegashimæ, Pils.	Tanegashima, Osumi,	.08-.12
*813	tantilla, Pils.	Goto, Hizen,	.08-.12
	8 tau, Bttg.	Kyoto, Yamashiro,	.01-.02
*550	tosana, Pils.	Ushirogawa, Tosa,	.07-.12
*638b	tryoni, Pils.	Hachijo, Izu,	.08-.12
*816	una, Pils.	Goto, Hizen.	
462	valida, var. fasciata, Sykes.	Miyako, Loochoo,	.04-.06
*633	valida, var. perfasciata, Pils.	Kunchan, Loochoo,	.05-.08
732	(Reinia) variegata, A. Ad.	Hirado, Hizen,	.04-.07
*942	(Reinia) variegata, var. nakadai, Pils.	Hachijojima, Izu.	
675	vasta, Bttg.	Fukuregi, Higo.	

"CRYSTALLUS."

*	... velatus, Gude.	Kyoto, Yamashiro.
*	... sulcatus, Gude.	Kyoto, Yamashiro.

COCHLICOPA.

362	lubrica, Müll.	Shikunobe, Ojima,	.05-.07
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CYCLOPHORUS.

2	herklotsi, Mart.	Kyoto, Yamashiro,	.02-.04
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*421	herklotsi, var.		
	expallescens, Ehrm.	Kagoshima, Satsuma,	.05-.07
*644	hirasei, Pils.	Oshima, Osumi.	
*574	kikaiensis, Pils.	Kikai, Osumi,	.06-.10
*684b	kikaiensis, Pils.	Kikai, Osumi, (fossil.)	.10-.15
372	turgidus, Pfr.	Loochoo,	.03-.05
684a	turgidus, Pfr.		
	(fossil, large var.)	Kikai, Osumi,	.10-.15
*713	turgidus, var.		
	angulatus, Pils.	Loochoo,	.12-.20

CYCLOTUS.

54	campanulatus, Mart.	Senzan, Awaji,	.04-.06
*612	hirasei, Pils.	Loochoo,	.06-.10
*307	micon, Pils.	Kashima, Harima,	.03-.05

DIPLOMMATINA.

*604	cassa, Pils.	Kodakari, Hida,	.04-.07
512	collarifera, S. & B.	Ibuki, Omi,	.04-.07
*870	dormitor, Pils.	Kikaigashima, Osumi.	
*620	insularum, Pils.	Yaeyama, Loochoo,	.05-.08
*822	kiiensis, Pils.	Tairiui, Awa (Shikoku),	.05-.08
*305b	kobelti, Ehrm.	Kashima, Harima,	.04-.06
*812	kobelti, var.		
	ampla, Pils.	Goto, Hizen,	.05-.08
*629	luchuana, Pils.	Kunchan, Loochoo.	
305a	nipponensis, Mlldff.	Kashima, Harima,	.04-.06
*647	oshimæ, Pils.	Oshima, Osumi.	
*836a	pudica, Pils.	Nachi, Kii,	.06-.08
521	pusilla, Mart.	Kashima, Harima,	.04-.07
*487	pusilla, var.		
	omiensis, Pils.	Ibuki, Omi,	.04-.07
*649	saginata, Pils.	Oshima, Osumi,	.06-.10
*639	septentrionalis, Pils.	Kayabe, Ojima,	.05-.08
*668	tanegashimæ, Pils.	Tanegashima, Osumi,	.06-.10
*296	tenuiplica, Pils.	Kashima, Harima,	.04-.06
*648	turris, Pils.	Oshima, Osumi,	.06-.10
*510	uzenensis, Pils.	Nishigo, Uzen,	.05-.08
*679	yakushimæ, Pils.	Yakushima, Osumi,	.06-.10

ENNEA.

*295	iwakawa, Pils.	Kashima, Harima,	.04-.06
*680	iwakawa, var.		
	yakushimæ, Pils.	Yakushima, Osumi,	.05-.08

EULOTA (AEGISTA).

*451	aperta, Pils.	Fukura, Awaji,	.07-.12
*761	aperta, var.		
	cavata, Pils.	Tomisato, Kii,	.08-.12
*787	aperta, var.		
	trachyderma, Pils.	Ikoma, Kii.	
*937	aperta, var.		
	mikuriyensis, Pils.	Mikuriya, Suruga.	
343	friedeliana, Mart.	Hirado, Hizen,	.04-.07
*960	intonsa, Pils. & Hir.	Suimura, Awa.	
288	kobensis, S. & B.	Kyoto, Yamashiro,	.10-.15
*969	kobensis, var.		
	gotoensis, P. & H.	Goto, Hizen.	
*353	martensiana, Pils.	Sedake, Osumi,	.15-.25
*929	minima, Pils.	Oshima, Osumi.	
*590	mimula, Pils.	Kayabe, Ojima,	.08-.12
*753	mimuloides, Gude.	Itanami, Omi.	
475	oculus, Pfr.	Loochoo,	.08-.12
998	subchinensis, Nev.	Loochoo.	
272	vermis, Rve.	Loochoo,	.20-.30

EULOTA (COELORUS).

*9	cavicollis, Pils.	Kyoto, Yamashiro,	.06-.10
*815	caviconus, Pils.	Goto, Hizen.	

EULOTA (EUHADRA).

359	blakeana, Newc.		
	var. blakei, Kob.	Shikunobe, Ojima,	.10-.15
528	blakeana, var.		
	sericea, Gude.	Nobusayama, Teshiwo.	
271	caliginosa, Ad. & R.	Yaeyama, Loochoo,	.08-.12
224	callizona, var.		
	amaliae, Kob.	Tadachi, Shinano,	.05-.08

82	callizona, var.		
	congenita, Smith.	Kobe, Settsu.	
*87	callizona, var.		
	dixonii, Pils.	Inga, Hoki,	.12-.20
399	callizona, var.		
	maritima, P. & G.	Hagi, Nagato,	.05-.08
*239	callizona, var.		
	minor, Gude.	Hagi, Nagato,	.06-.10
393	connivens, Pfr.	Itoman, Loochoo,	.04-.06
472	connivens, var.		
	phaeogramma, Anc.	Kikai, Osumi,	.05-.08
*556	grata, Gude.	Nishigo, Uzen,	.30-.50
73	luhuana, Sowb.	Hirado, Hizen,	.04-.07
*547	luhuana, var.		
	aomoriensis, G., P.	Chojamura, Mutsu,	.08-.15
*186b	luhuana, var.		
	arimensis, G., P.	Tadachi, Shinano.	
248	luhuana, var.		
	eoae, Crosse.	Mikuriya, Suruga,	.10-.15
199	luhuana, var.		
	idzumonis, P. & G.	Takeya, Idzumo.	
*73b	luhuana, var.		
	nesiotica, Pils.	Tanegashima, Osumi.	
*682	luhuana, var.		
	pachya, Pils.	Kikai, Osumi, (fossil)	.15-.20
19	luhuana, var.		
	tsushimana, Mldff.	Izuhara, Tsushima,	.04-.07
*116	luna, Pils.	Iwamizawa, Ishikari.	
371	mercatoria, Gray.	Loochoo,	.05-.08
496	mercatoria, var.		
	atrata, Pils.	Kunchan, Loochoo,	.10-.30
*683	mercatoria, var.		
	dæmonorum, Pils.	Kikai, Osumi, (fossil.)	.15-.20
*357	oshimæ, Pils.	Oshima, Osumi,	.15-.30
231	pelionphala, Pfr.	Gomei, Kai,	.05-.08
319	pelionphala, Pfr.		
	(large var.)	Kyoto, Yamashiro,	.08-.15
560	pelionphala, var.		
	brandtii, Kob.	Manabe, Hitachi,	.07-.10

90	pelionphala, var. herklotsi, Mart.	Kyoto, Yamashiro,	.04-.06
139	pelionphala, var. nimbosa, Crosse.	Toyado, Shimotsuke.	
*358	pelionphala, var. sep- tentrionalis, Ehrm.	Shikunobe, Ojima,	.06-.10
402	quaesita, Desh.	Nishigo, Uzen,	.05-.08
*994	sadoensis, Pils. & Hir.	Sotokaifumura, Sado.	
225	scaevola, Mart.	Ibuki, Omi,	.20-.30
186a	senckenbergiana, K.	Kokubu, Hida,	.15-.25
199	senckenbergiana, Kob. (var.)	Takeya, Izumo,	.08-.15
*828	senckenbergiana, var. awaensis, Pils.	Suimura, Awa (Shikoku),	.20-.30
*660	submandarina, Pils.	Tanegashima, Osumi,	.12-.20
*835a	submandarina, Pils.	Kikai, Osumi, (fossil.)	.15-.25
*777	submandarina, var. compacta, Pils.	Yakushima, Osumi,	.25-.35
*672	submandarina, var. magna, Pils.	Yakushima, Osumi.	
291	yaeyamensis, Pils.	Loochoo,	.40-.60

EULOTA (EULOTELLA).

4	similaris, Fer.	Kyoto, Yamashiro,	.02-.04
545	commoda, A. Ad.	Kayabe, Ojima,	.06-.10

EULOTA (PLECTOTROPIS).

*431	aemula, Gude.	Takeya, Izumo,	.06-.10
*774	deflexa, Pils.	Tobishima, Ugo,	.12-.20
396	elegantissima, Pfr.	Naha, Loochoo,	.05-.08
*536	elegantissima, var. cara, Pils.	Kunchan, Loochoo,	.07-.12
*943	hachijoensis, Pils.	Hachijo-jima, Izu.	
*407	horrida, Pils.	Nishigo, Uzen,	.12-.20
*596	inornata, Pils.	Yaeyama, Loochoo,	.15-.35
*479	kiusiuensis, Pils.	Kikai, Osumi,	.15-.25
*914	kiusiuensis, var. oshimana, P. & H.	Oshima, Osumi.	

*464	lepidophora, Gude.	Loochoo,	.04-.07
273	mackensii,		
	A. Ad. & Rve.	Yaeyama, Loochoo,	.10-.15
*752	omiensis, Pils.	Itanami, Omi,	.15-.25
*752a	omiensis, var.		
	echizenensis, Pils.	Arato, Echizen.	
*773	pannosa, Pils.	Atsumi, Uzen,	.12-.20
461	scepasma, Pfr.	Loochoo,	.06-.10
*694	shikokuensis, Pils.	Yoshida, Iyo.	
110	trochula, A. Ad.	Izuhara, Tsushima,	.05-.08
10a	vulgivaga, S. & B.	Kyoto, Yamashiro,	.05-.08
10b	vulgivaga, S. & B. var.	Ibuki, Omi,	.05-.08
*825	vulgivaga, var.		
	lanx, Pils.	Suimura, Awa (Shikoku),	.10-.15

EULOTA (ACUSTA).

394	despecta, Gray.	Naha, Loochoo,	.04-.07
459	despecta, Gray.		
	(large var.)	Loochoo.	
685	despecta, Gray.		
	(large var., fossil.)	Kikai, Osumi.	
*474a	despecta, var.		
	kikaiensis, Pils.	Kikai, Osumi.	
*249	gainesi, Pils.	Ushika, Teshiwo,	.10-.15
216	gainesi, var.		
	gudeana, Pils.	Kiyokawa, Ojima,	.06-.10
409	sieboldiana, Pfr.	Nishigo, Uzen,	.03-.05
*14	sieboldiana, var.		
	minor, Gude.	Kyoto, Yamashiro.	

GANESELLA.

*352	adelinæ, Pils.	Oshima, Osumi,	.25-.40
*783b	cristata, Pils.	Nachi, Kii.	
*975	cardiostoma, var.		
	kagaensis, P. & H.	Hakusan, Kaga.	
*734	fausta, Pils.	Mikuriya, Suruga.	
*508	ferruginea, Pils.	Ushirogawa, Tosa,	.10-.15
*309	jacobii, Pils.	Ibuki, Omi,	.15-.25
12	japonica, Pfr.	Kyoto, Yamashiro,	.07-.12

*513a	japonica, var. cari-		
	nata, Pils. & Gul.	Ibuki, Omi,	.10-.15
*548a	japonica, var.		
	granulosa, Pils.	Kyoto, Yamashiro,	.07-.12
*252	japonica, var.		
	heteroglypta, Pils.	Fukura, Awaji,	.10-.15
106	japonica, var.		
	satsuma, Pils.	Kamo, Shima.	
460	largillierti, var.		
	cineta, Pils.	Loochoo,	.08-.12
535	largillierti, var.		
	cosmia, Pils.	Shimaziri, Loochoo,	.08-.12
74	myomphala, Mart.	Hirado, Hizen,	.15-.25
328	myomphala, var.		
	fusca, Gude.	Kokubu, Hida,	.15-.25
96	myomphala, var.		
	minor, Gude.	Toyonishikami, Nagato,	.10-.15
*260	myomphala, var.		
	omphalodes, Pils.	Omikado, Inaba.	
*289c	notoensis, Pils. & Hir.	Kitanosho, Noto.	
*824	optima, Pils.	Suimura, Awa (Shikoku).	
*61	pagodula, Ehrm.	Nohara, Yamato,	.12-.20
*788	selasia, Pils.	Nachi, Kii.	
*834	sororecula, Pils.	Kikai, Osumi (fossil).	
289	stearnsii, Pils.	Kyoto, Yamashiro,	.30-.40
*689a	tanegashimæ, Pils.	Tanegashima, Osumi.	
*689b	tanegashimæ, var.		
	dulcis, Pils.	Tanegashima, Osumi.	
*577	wiegmanniana, Pils.	Kochi, Tosa.	.10-.15

GEORISSA.

*471	japonica, Pils.	Kashima, Harima,	.04-.07
*623b	luchuana, Pils.	Yaeyama, Loochoo.	

HIRASEA.

*897	acuta, Pils.	Imotoshima, Ogasawara.	
*848	acutissima, Pils.	Hahajima, Ogasawara.	
*849	biconcava, Pils.	Hahajima, Ogasawara.	.10-.15

*800	chichijimana, Pils.	Chichijima, Ogasawara.	
*863	diplomphalus, Pils.	Chichijima, Ogasawara.	
*847	eutheca, Pils.	Hahajima, Ogasawara.	
*864	goniobasis, Pils.	Chichijima, Ogasawara.	
*850	hypolia, Pils.	Hahajima, Ogasawara,	.08-.15
*865	major, Pils.	Chichijima, Ogasawara.	
*854	(Fametesta)mirabilis, Pils.	Hahajima, Ogasawara.	
*801	nesiotica, Pils.	Hahajima, Ogasawara,	.10-.15
*863c	profundispira, Pils.	Chichijima, Ogasawara.	
*802	sinuosa, Pils.	Hahajima, Ogasawara,	.10-.15

HIRASIELLA.

*867	clara, Pils.	Chichijima, Ogasawara.	
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HELICINA.

*806	capsula, Pils.	Hahajima, Ogasawara.	
595	hakodadiensis, Hartm.	Kayabe, Ojima,	.05-.08
*852	hirasei, Pils.	Hahajima, Ogasawara,	.10-.15
759	japonica, A. Ad.	Tobishima, Ugo (type loc.),	.08-.12
*575	japonica, var. uzenensis, Pils.	Nishigo, Uzen,	.06-.10
*808	ogasawarana, Pils.	Hahajima, Ogasawara,	.10-.15
*809	ogasawarana, var. discrepans, Pils.	Chichijima, Ogasawara.	
*862	ogasawarana, var. optima, Pils.	Chichijima, Ogasawara.	
*558	osumiensis, Pils.	Kikai, Osumi,	.05-.08
308	reinii, Kob.	Ibuki, Omi,	.04-.06
*55	reinii, var. expolita, Pils.	Senzan, Awaji,	.03-.05
*991	sadoensis, Pils. & Hir.	Sotokaifa, Sado.	
470	verecunda, Gld.	Loochoo,	.04-.07
*624	yaeyamensis, Pils.	Yaeyama, Loochoo,	.04-.07
*807b	yoshiwarana, Pils.	Hahajima, Ogasawara.	
*807a	yoshiwarana, var. arata, Pils.	Hahajima, Ogasawara.	

- *857 yoshiwarana, var.
microtheca, Pils. Hahajima, Ogasawara, .08-.12

KALIELLA.

- 448 acutangula, A. Ad. Kyoto, Yamashiro, .05-.08
 *627 austeniana, Pils. Yaeyama, Loochoo.
 *641 borealis, Pils. Kayabe, Ojima.
 *482 ceratodes, Gude. Kashima, Harima.
 *518 circumcincta, Reinh.,
 var. elata, Gude. Kashima, Harima.
 *609 crenulata, Gude. Kochi, Tosa.
 *519 fraterna, Pils. Kashima, Harima.
 *678 gudei, Pils. & Hir. Kayabe, Ojima.
 *655 harimensis, Pils. Kashima, Ojima, .06-.10
 *971 kagaensis,
 Pils. & Hir. Hakusan, Kaga.
 *697 kyotoensis, Pils. Kyoto, Yamashiro, .05-.08
 *678 gudei, Pils. & Hir. Kayabe, Ojima, .08-.12
 * . . . lioderma, Pils. Kashima, Harima.
 *941 hachijoensis, Pils. Hachijo-jima, Izu.
 *892 hizenensis, Pils. Hirado, Hizen.
 *720 modesta, Pils; Oshima, Higo.
 *300 multivolvus, Pils. Kashima, Harima, .05-.08
 *466 nahaensis, Gude. Loochoo, .04-.07
 *625b nahaensis, var.
 kunchana, Pils. Kunchan, Loochoo.
 *490 nanodes, Gude. Kyoto, Yamashiro.
 *846 ogasawarana, Pils. Hahajima, Ogasawara, .10-.15
 *891 okiana, Pils. Hirado, Hizen.
 *514 pagoduloides, Gude. Kashima, Harima.
 *952 pallida, Pils. Hachijo-jima, Izu.
 *743 praealta, Pils. Ryozen, Omi.
 *302 reinhardti, Pils. Kashima, Harima, .05-.07
 *607 ruida, Pils. Gojo, Yamato.
 * . . . subcrenulata, Pils. Kochi, Tosa.
 *625a yaeyamensis, Pils. Yaeyama, Loochoo, .06-.10
 *606a yamatoensis, Pils. Gojo, Yamato, .06-.10

LEPTOPOMA.

275	vitreum, Less.	Yaeyama, Loochoo,	.05-.08
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MACROCHLAMYS.

*838	cerasina, Pils.	Tobishima, Ugo,	.08-.15
*821	cerasina, var.		
	awaensis, Pils.	Tairiui, Awa (Shikoku),	.08-.12
495	doenitzi, Reinh.	Kyoto, Yamashiro,	.06-.08
*785	dulcis, Pils.	Nachi, Kii.	
*465	fulgens, Gude.	Loochoo,	.05-.08
*635	gudei, Pils.	Kunchan, Loochoo.	.
*974	kagaensis, Pils.	Hakusan, Kaga.	
*282	micrograpta, Pils.	Kashima, Harima.	
*637	perfragilis, Pils.	Kunchan, Loochoo.	
*1000	perfragilis, var.		
	shikokuensis, Pils.	Kotsuzan, Awa.	
935a	semisericata, Pils.	Kurozu, Kii.	
*666	tanegashimæ, Pils.	Tanegashima, Osumi,	.06-.12

MANDARINA.

*805	exoptata, Pils.	Hahajima, Ogasawara,	.25-.40
*845	exoptata, var.		
	obtusa, Pils.	Hahajima, Ogasawara.	
*860	hirasei, Pils.	Chichijima, Ogasawara.	
467a	mandarina, Gray.	Hahajima, Ogasawara,	.10-.15
*858	mandarina, var.		
	hahajimana, Pils.	Hahajima, Ogasawara,	.25-.40
*467b	mandarina, var.		
	ponderosa, Pils.	Hahajima, Ogasawara,	.15-.25
*896	mandarina, var.		
	conus, Pils.	Imotoshima, Ogasawara.	
906	ruschenbergeriana,		
	Pils.	Chichijima, Ogasawara.	
859	pallasiana, Pfr.	Chichijima, Ogasawara.	

MELAMPUS.

446	caffer, Krauss.	Hirado, Hizen,	.03-.05
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MICROCYSTINA.

*949	circumdata, Pils.	Hachijojima, Izu.	
*482	ceratodes, Gude.	Kashima, Harima.	
*667	hiraseana, Pils.	Tanegashima, Osumi.	.06-.12
*803	hahajimana, Pils.	Hahajima, Ogasawara,	.08-.12
*973	nuda, Pils.	Hakusan, Kaga.	
483	sinapidium, Reinh.	Kashima, Harima,	.06-.10
*900	yakuensis, Pils.	Yakushima, Osumi.	
*1002	higashiyamana,		
	Pils. & Hir.,	Higashiyama, Awa.	

NESOPUPA.

*855	dedecora, Pils.	Hahajima, Ogasawara,	.08-.12
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OMPHALOTROPIS.

*588	japonica, Pils.	Kashiwashima, Tosa.	.05-.08
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OPEAS.

*286a	brevispira, Pils.	Kashima, Harima,	.08-.12
456a	gracilis, Hutt.	Loochoo,	.05-.07
*286b	kashimæ, Pils.	Kashima, Harima,	.04-.07
*313b	kyotoensis, Pils.	Kyoto, Yamashiro,	.04-.07
*456b	obesispira, Pils.	Loochoo,	.05-.07
313a	pyrgula, A. Ad.	Kyoto, Yamashiro,	.04-.07

OTESIA.

673	japonica, Mlldff.	Kagoshima, Satsuma.	
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PUNCTUM.

*553	amblygonum, var.		
	pretiosum, Gude.	Fukura, Awaji,	.04-.07
*517	japonicum, Pils.	Kashima, Harima.	
*553b	morseanum, Pils.	Hirado, Hizen.	

PUPINELLA.

*665a	funatoi, Pils.	Tanegashima, Osumi,	.06-.10
*645	oshimæ, Pils.	Oshima, Osumi,	.06-.10
51	rufa, Sowb.	Senzan, Awaji,	.03-.05
*731b	rufa, var. alba, Pils.	Hirado, Hizen,	.06-.10

- *665b rufa, var. tane-
gashimae, Pils. Tanegashima, Osumi, .04-.07

PUPISOMA.

- *972 edentulum, Drap. Hakusan, Kaga.

PYRAMIDULA.

- *961 conica, Pils. Suinura, Awa.
405 pauper, Gld. Nishigo, Uzen, .02-.03
529 pauper, var.
depressa, A. Ad. Nobusayama, Teshiwo, .05-.07
*950 pauper, var.
hachijoensis, Pils. Hachijo-jima, Izu.

PYTHIA.

- *710b aegialites, Pils. Loochoo.
444 cecillei, Phil. Hirado, Hizen, .05-.08
*709 pachyodon, Pils. Loochoo.
453 Pythia sp. Loochoo, .04-.06

SITALA.

- *717 circumcincta, var.
elata, Gude. Takayama, Iyo, .05-.08
*953 latissima, Pils. Yaeyama.

SPIROPOMA (FORMERLY COELOPOMA).

- 53 japonicum, A. Ad. Senzan, Awaji, .03-.05
*658 nakadai, Pils. Tanegashima, Osumi, .06-.10

SPHYRADIUM.

- 972 edentulum, Drap. Hakusan, Kaga; Kiyotaki, Omi.

SUCCINEA.

- *642 hirasei, Pils. Tsuchiura, Hitachi, .05-.08
312 horticola, Reinh. Kyoto, Yamashiro, .04-.07
408 lauta, Gld. Nishigo, Uzen, .03-.05
*617a ogasawarae, Pils. Hahajima, Ogasawara, .06-.08
*617b punctulispira, Pils. Hahajima, Ogasawara.

TORNATELLINA.

*948	biplicata, Pils.	Hachijojima, Izu.	
*626	inexpectata, Pils.	Yaeyama, Loochoo,	.05-.08
*799	ogasawara, Pils.	Chichijima, Ogasawara.	
*851	tryoni, Pils.	Hahajima, Ogasawara.	

TRISHOPLITA.

*600	collinsoni, var.		
	casta, Pils.	Obi, Hiuga.	
*691	collinsoni, var.		
	okinoshimæ, Pils.	Okinoshima, Tosa.	
*565	cretacea, Gude.	Ushirogawa, Tosa,	.12-.20
*566	cretacea, var.		
	bipartita, Pils.	Toyonishikami, Nagato,	.10-.15
*507	dacostæ, Gude.	Kagoshima, Satsuma.	
*344	dacostæ, var.		
	strigata, Pils.	Hirado, Hizen,	.06-.10
*643	dacostæ, var.		
	awajensis, Pils.	Anaga, Awaji,	.06-.10
7	goodwini, Smith.	Kyoto, Yamashiro,	.05-.08
*5	goodwini, var.		
	kyotoensis, Pils.	Kyoto, Yamashiro,	.06-.10
310	hilgendorffii, Kob.	Ibuki, Omi,	.05-.08
*746	hilgendorffii, var.		
	chikubushimæ, Pils.	Chikubushima, Omi.	
*751a	hilgendorffii, var.		
	tenuis, Pils.	Ibuki, Omi,	.06-.10
*303	hilgendorffii, var.		
	rufa, Pils.	Kashima, Harima.	
*601	hiugensis, Pils.	Obi, Hinga.	
580	mesogonia, Pils.		
	(var.)	Kochi, Tosa,	.06-.10
581a	pallens, Ehrm.	Arakura, Tosa,	.10-.15
*387	pura, Ehrm.	Inga, Hoki.	
*581b	smithiana, Pils.	Arakura, Tosa,	.10-.15
*389	tosana, Gude.	Ushirogawa, Tosa,	.10-.15
*751b	tosana, var.		
	anozona, Pils.	Akasaka, Mino.	

TROCHOMORPHA.

- | | | | |
|------|---------------------------|-------------------|---------|
| *650 | <i>gouldiana</i> , Pils. | Oshima, Osumi, | .06-.10 |
| 631 | <i>horiomphala</i> , Pfr. | | |
| | (<i>fritzei</i> , Bttg.) | Kunchan, Loochoo. | |

TRUNCATELLA.

- | | | | |
|-------|----------------------------|---------------------|---------|
| *811c | <i>kiusiuensis</i> , Pils. | Tanegashima, Osumi, | .05-.08 |
|-------|----------------------------|---------------------|---------|

VERTIGO.

- | | | |
|------|------------------------|--------------------|
| *570 | <i>hirasei</i> , Pils. | Yanagawa, Chikugo. |
|------|------------------------|--------------------|

VALLONIA.

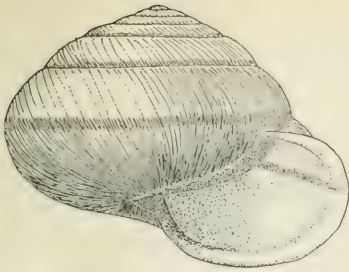
- | | | |
|-----|------------------------|----------------|
| 281 | <i>tenera</i> , Reinh. | Osaka, Settsu. |
|-----|------------------------|----------------|

ZONITOIDES.

- | | | | |
|------|----------------------------|-------------------|---------|
| 1005 | <i>arboreus</i> , Say. | Tokyo. | |
| 554 | <i>minusculus</i> , Binn. | Fukura, Awaji, | .04-.07 |
| *951 | <i>subarboreus</i> , Pils. | Hachijojima, Izu. | |

EXPLANATION OF PLATE.

- Fig. 1. *Ganesella myomphala* Martens. Hirado, Hizen.
 Fig. 2. *Clausilia martensi* var. *reiniana* Kob. Ibuki, Omi.
 Fig. 3. *Eulota callizona* var. *dixonii* Pils. Takeya, Idzumo.
 Fig. 4. *Eulota senckenbergiana* var. *awaensis* Pils. Suimura, Awa.
 Figs. 5, 6. *Eulota elegantissima* var. *cara* Pils. Riukiu.
 Fig. 7. *Mandarina mandarina* var. *trifasciata* Pils. Nakano-shima, Ogasawara.
 Fig. 8. *Fametesta mirabilis* Pils. Habajima, Ogasawara.
 Fig. 9. *Hirasea profundispira* Pils. Chichijima, Ogasawara.
 Fig. 10. *Hirasiella clara* Pils. Chichijima, Ogasawara.
 Fig. 11. *Cyclophorus hirasei* Pils. Oshima, Osumi.
 Fig. 12. *Pupinella oshimæ* Pils. Oshima, Osumi.
 Fig. 13. *Ganesella largillierti* Phil. Riukiu.
 Figures 8, 9, 10, 12 are enlarged, the others are natural size.



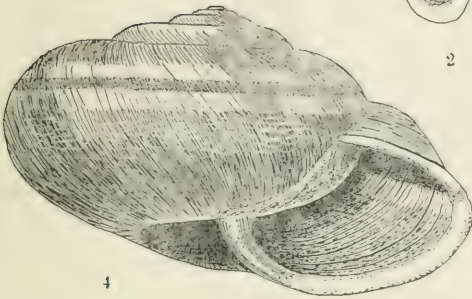
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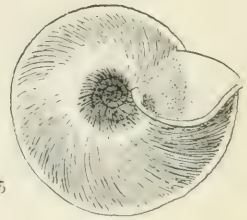
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13

JAPANESE LAND SHELLS.

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THE NAUTILUS.

VOL. XVII.

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No. 1.

TO OUR READERS.

With the present issue, the *publication office* of THE NAUTILUS is changed from the Wagner Institute, Philadelphia, to the Boston Society of Natural History, Boston, Mass. This change is in consequence of the appointment of MR. JOHNSON, the Business Manager and Junior Editor, to the curatorship of the Boston Society. All subscriptions, advertisements and other business communications should hereafter be addressed to MR. JOHNSON, at the Boston Society; while MSS. for publication should be sent to DR. PILSBRY, at the Academy of Natural Sciences of Philadelphia. Books and papers for review may be sent to either or both of the editors.

MONTANA SHELLS - PYRAMIDULA STRIGOSA.

MORTON J. ELROD.

The various forms of *Pyramidula strigosa* give a series of exceedingly interesting and widely varied structure. The series found in western Montana shows plainly the result of different environment. The different forms of *strigosa* vary from the large shells along Flat-head Lake, measuring 24.34 mm. in diameter, to the very small specimens described below. On July 15, 1900, the ascent of Sinyaleamin mountain was made. At height of 8,500 feet an alpine variety was found among the loose rock. There was very little vegetation. No trees were near. They had been left 500 feet below. An occasional scrubby plant and the lichens of the rocks afford the food. Ten days

later an ascent was made of McDonald's Peak, fifteen miles further north in the range. At height of 7,500 feet a hunt was made for the shells, and the first were found at 7,800 feet, continuing until nearly 8,500, when the rocks were so large and so steep it was useless to search for them.

Finding specimens on the high slopes of two peaks in the same range, at about the same altitude in each case, seems to indicate that they are not found lower. At this altitude the summer is short. The months of June, July, August, with possibly a little of September, is the period of activity. Snow was not far from the specimens found. In one case, only a few feet from the shells was a large snow bank.

The slope on McDonald on which they were found lies to the west. The shells here would receive the sun early in the forenoon, and the last rays as the sun sank behind the hills would strike the ridge on which they were living. The conditions were much more favorable than on Sinyaleamin peak. The snow melts sooner, the ridge is broader with more pulverized rock and more vegetation. The absence of snow tempers the winds. The altitude is a few hundred feet lower, which might make a difference.

Search was made for an hour or more for the shells. A large shell vial was filled, a couple of dozen live ones being placed in a separate vial. Living specimens on both McDonald and Sinyaleamin peaks were proof that they live there at the present. The summit of McDonald is too rough and broken, without soil or vegetation, for shells to live. None were found.

As these shells show decided differences from any yet collected, they are here given as a separate variety, and description follows. They seem distinct enough to mark a separate species.

Pyramidula strigosa Gld., var. *alpina* n. var.

Shell small; brownish-gray, tending toward light horn color, in dead shells turning to pearly white; lustre somewhat silky; shell flat, little elevated; lines of growth, under hand lens, fine, an occasional increment of growth giving the appearance of sculpturing; suture well impressed, the periphery well rounded; aperture nearly circular, slightly obovate, somewhat higher than wide; markings as in *strigosa*, the upper band continuing in the spire, gradually disappearing; umbilicus medium, circular, deep, subcylindric.

Large diam., 7-10 mm., average of ten specimens, 8.91 mm.; greatest depth, 3-5 mm., average of ten, 4.34 mm.; aperture, 3.65-4.38 mm., average of eight, 3.99; whorls, 4-4.50 mm., average of ten, 4.26 mm.

Specimens taken at 8,500 feet, on Sinyaleamin mountain, Mission Range, Montana. Also taken on McDonald Peak, same range. Alt. 7,800 to 8,500. Types at the University of Montana.

The averages from the seven localities where shells have been collected show very conclusively the effect of altitude on the size of the shells. Increase in altitude diminishes the length of the season, the amount of heat received, the amount of food supply, and the chances of life. The result is to stunt or dwarf the animals attaining the heights. This is plainly shown in the sizes of shells at the different altitudes. As greater altitudes are reached, shells reduce in diameter, in depth, in the size of the aperture and in the number of whorls. Young specimens taken from the adults at Flathead Lake had shells with 2.25 to 2.50 whorls. If all the young at different altitudes start with the same number when born, the reduction of shell growth in spirals is easily deduced. The very significant observation is that a few hundred feet in altitude shows a corresponding reduction in size of the shells. The smallest shells are but three-eighths the diameter of the largest, one-third of the depth, have an aperture two-fifths as large, and have but two-thirds the number of whorls. The relative proportions of the largest, from Flathead Lake, to the smallest, on Sinyaleamin mountain, are seen from the following approximate ratios:

	Largest shells.	Smallest shells.
Large diam. to depth . . .	11 to 7	14 to 7
Depth to width of aperture . .	28 to 22	20 to 22
Large diam. to aperture . . .	23 to 11	21 to 11

This story, in brief, as brought out by study, is as follows: *Pyramidula strigosa*, var. *cooperi*, from some source got into the Flathead Lake region. At this altitude, 3,000 feet, it flourished and grew, but the slow-moving animals migrated. As they ascended the mountain sides, following the streams to the banks of the lakes, and then ascended the wooded slopes the difficulties in securing food for existence became more of a problem. The shorter season required more hardy animals. Stunting or accidental variation produced smaller individuals, which would not require so much food on account of the

reduced size. The ascent of the mountain continuing, the reduction in size became more pronounced, resulting in the specimens as found. The shells at high altitude are less than one-half the size in any dimensions, as a consequence being less than one-eighth in volume. Present collecting shows that all but the two extremes have been by some perchance killed, although later search may produce the intervening specimens. But in many places in the mountains of western Montana shells of medium size are found at from 5,000 feet to 6,000 feet or higher.

Pyramidula strigosa Gld., var. *Cooperi* W. G. B.

This species abounds along the banks of Flathead Lake and along the banks of lakes in the Mission mountains. At Sinyaleamin Lake, in this range, altitude about 3,800 feet, they were not uncommon, but could not be called abundant. Associated with it, but occurring in very small numbers, was *Polygyra townsendiana* Lea, var. *ptychophora* A. D. Br., and *Pyramidula solitaria* Say. At McDonald Lake, in the same range and fifteen miles further north, the species was abundant, in common again with the *Polygyra* and *P. solitaria* Say. Here some two quarts were secured by a day's search among the dead leaves and under decaying logs. To gather them was to crawl on hands and knees among the dense growth of small trees and underbrush, the interlacing dead branches being a constant hindrance as well as a menace to clothing. Many live ones were secured. A large series was gathered which had evidently been killed and eaten by squirrels. As the pine squirrel, *Sciurus richardsoni* Buck, was rather abundant; he is charged with the damage, though it is not unlikely the little chipmunk, *Tamias* sp., takes a part in the work. This collecting was in July, 1900.

The shells were generally opened at the apex of the spire, a large opening being made. An occasional shell was punctured at some other place, but not many. The enemy seems to have discovered how and where to strike in order to secure the meal with the least effort. *Pyramidula strigosa* var. *Cooperi* had the larger number of shells thus injured—fifty-four. Of *Pyramidula solitaria* fifty were found cut by animals, and but three of *Polygyra townsendiana* var. *ptychophora*. The two former were much more abundant, and *cooperi* more conspicuous than *solitaria*. *P. townsendiana* were quite difficult to find, and the small number of injured shells shows how

this affects their mortality through foes. Being of the same color as the decaying leaves and moss, and for the most part under logs and debris, they seem to escape their enemies more readily than the two species of *Pyramidula*.

Along the banks of the Flathead Lake, near the University of Montana Biological Station, this species was also found in rather large numbers. In July, 1899, numbers of shells were found containing young. While they were in colonies, yet the specimens were much scattered, and it required much care and search to find them. The search was usually made after a rain, which was the most suitable time for finding them, but at the same time the conditions made the work very disagreeable.

Pyramidula strigosa Gld., a small variety.

Shells entirely different from those mentioned in the preceding paragraph are found on most of the lower slopes of western Montana. They fit in between *cooperi* and *alpina*, but are not found associated with either variety. Nowhere does it seem abundant. The small size is probably due to the shortness of the season at which the animals can live. By July the hills and mountain slopes have become dry and parched, although in this month there are occasional light showers. Their dimensions, in millimeters, are as follows for ten specimens taken at 5,000 feet: Large diameter, 11.95 to 16.73, average 13.83; depth, 5.30 to 7.40, average 6.12; aperture, 4.72 to 6.67, average 5.57; number of whorls, 4.8 to 5.4, average 6.15.

Pyramidula strigosa Gld., var.

A series of shells was collected on the Tobacco Root range by Earl Douglass and E. H. Murray, which the writer has examined. Another series was taken by Prin. P. M. Silloway, of Lewistown, Fergus county. These are the only collections of *strigosa* made in the State east of the Rocky Mountains, so far as the writer knows. They are immediately recognized as differing from those west of the divide. The sculpturing is coarser and they look thicker and more earthy. They are decidedly greater in depth than those found on the higher slopes west of the divide. They differ in these particulars also from the high altitude form *alpina*. In general shape they are much like *cooperi*, but very much smaller. The dimensions in mm., average of ten specimens, are as follows: From Tobacco Root mountains, altitude 7,000 feet. Large diameter, 15.21; depth, 9.30; aperture, 7.06;

whorls, 5.05. From Lewistown, altitude 4,792 feet. Large diameter, 16.80; depth, 11.78; aperture, 7.66; number of whorls, 5.28.

From the above it will be seen that the specimens at higher altitude are diminished in size, as also in the number of whorls in the shell, as is the case of those west of the main range.

The following table of comparisons of ten average specimens will give a better idea of the differences than can be given in any other way:

	Altitude.	Large Diam.	Depth.	Aperture.	No. whorls.
Flathead Lake	3,000	23.12	13.96	10.85	6.01
McDonald Lake	3,300	22.16	12.98	10.66	5.99
Sinyaleamin Lake . . .	3,800	21.82	12.28	10.24	5.75
Lewistown	4,792	16.80	11.78	7.66	5.28
Mt. Lo Lo	5,000	13.83	6.12	5.57	5.15
Tobacco Root Mts. . .	7,000	15.21	9.30	7.06	5.05
McDonald Peak	7,800	10.17	4.79	4.25	4.47
Sinyaleamin Peak . . .	8,500	8.91	4.34	3.99	4.26

In examining the preceding table, it will be remembered that the specimens from Lewistown and the Tobacco Root mountains were taken east of the continental divide, all the others from the west slope. The series ranges from 3,300 to 8,500 feet altitude. There is a gradual diminution in each measurement, the smallest and highest specimens showing about one-third the dimensions of the lowest and largest, with the whorls diminished almost two, or nearly one-third.

The two collections from the east side of the range show the same reduction, but the series is much smaller. I thought there was an error in the altitude of those from the Tobacco Root range, but as Mr. Douglass insists there is not, it appears that conditions there must differ from those prevailing elsewhere in the State.

WRITINGS OF JAMES G. COOPER, M. D., ON CONCHOLOGY AND PALAEONTOLOGY, WITH LIST OF SPECIES DESCRIBED BY HIM.

COMPILED BY WILLIAM J. RAYMOND.

Abbreviations: Proceedings of the California Academy of Sciences, first series: Pr. C. A. S.; second series, Pr. C. A. S. (2).

Bulletin of the California Academy of Sciences: Bull. C. A. S.
American Naturalist: Am. Nat.

American Journal of Conchology: Am. J. Conch.

An asterisk denotes that the species was discovered by Dr. Cooper. In addition to the species named in this list, more than eighty were discovered by Dr. Cooper and described by Newcomb, Carpenter and Gabb in 1863 and 1864.

1. Report of Explorations and Surveys for a Railroad to the Pacific Coast. Washington, 1860, XII, Part 2. Report upon the Mollusca Collected on the Survey, by William Cooper, with notes by J. G. Cooper, pp. 369-386. Also published in The Natural History of Washington Territory, by J. G. Cooper, M. D., and Dr. G. Suckley, U. S. A., 4to, pp. xiv, 497, New York, 1859.

**Chrysodomus middendorffii* n. sp. (William Cooper).

**Nassa gibbsii* n. sp.

**Ancylus caurinus* n. sp.? (No description.)

**Planorbis planulatus* n. sp.

Also Pac. Railroad Rep., I, 219-221, 1855, Natural History Report. Incidental references to Mollusca.

2. Notice of Land and Freshwater Shells collected by Dr. J. G. Cooper in the Rocky Mountains, etc., in 1860. By T. Bland and J. G. Cooper, Ann. Lyc. Nat. Hist. N. Y., VII, 1-9, Pl. IV, 1861.

**Helix mullani* n. sp.

**Helix polygyrella* n. sp.

3. On some New Genera and Species of California Mollusca. Pr. C. A. S. II, 202-207. 1863.

Strategus n. gen.

**Pleurophyllidia californica* n. sp.

**Strategus inermis* n. sp.

**Doris montereyensis* n. sp.

**Æolis opalescens* n. sp.

**Doris sanguinea* n. sp.

**Æolis iodinea* n. sp.

**Doris alabastrina* n. sp.

**Tritonia palmeri* n. sp.

**Doris sandiegensis* n. sp.

4. *Strategus* (preoccupied) changed to *Navarchus*. Pr. C. A. S., III, 8.

5. On New or Rare Mollusca Inhabiting the Coast of California. Pr. C. A. S., III, 56-60, fig. 14. 1863.

Neaplysia n. subgen.

**Triopa catalinæ* n. sp.

**Aplysia californica* n. sp.

**Dendronotus iris* n. sp.

**Doris albopunctata* n. sp.

**Æolis barbarensis* n. sp.

6. On the New Genus of Terrestrial Mollusca Inhabiting California. Pr. C. A. S., III, 62-63, fig. 15. 1863.

**Binneya notabilis* n. gen., n. sp.

7. Descriptions of New Species of Marine Shells from the Coast of California, by Wm. M. Gabb. Pr. C. A. S., III, 1865. Described by Dr. Cooper, page 188.

**Gadinia (Rowellia) radiata* n. subgen., n. sp.

8. Description of a New California Helix, with notes on others already described. Pr. C. A. S., III, 259-261. 1866.

**Helix sequoicola* n. sp.

9. On a New Species of Pedipes Inhabiting the Coast of California. Pr. C. A. S., III, 294-5, fig. 29. 1866.

**Pedipes unisulcata* n. sp.

10. The West Coast Helicoid Land Shells. Pr. C. A. S., III, 331-9. A synopsis of 55 species.

11. Geographical Catalogue of the Mollusca found west of the Rocky Mountains, between 33° and 49° north latitude. Pamph. 4to, 40 pages. San Francisco, 1867. 795 species named, with geographical range.

12. Cronise's Natural Wealth of California. San Francisco, 1868. Chapter on Zoology by J. G. Cooper, M. D. 55 species of Mollusca, mainly edible, pages 499-501.

13. The Fauna of Montana Territory. Papers in six issues of Am. Nat. on Mammals, Birds, Reptiles, Fishes; and the Shells of Montana, vol. II, 486-7. 1868-9. 24 species enumerated, with notes.

14. On a New Californian Terrestrial Mollusc. Am. J. Conch., IV, 209, 210, Pl. 18, figs. 1-3. 1869.

Ammonitella yatesii n. gen., n. sp.

15. On the Distribution and Localities of West Coast Helicoid Land Shells, &c. Am. J. Conch., IV, 211-240. 1869.

16. Notes on the Fauna of the Upper Missouri. Am. Nat., III, 294-9. 1869. Includes list of 7 Mollusca.

17. The Naturalist in California. Am. Nat., III, 182-9 and 470-481. Incidental references to the Mollusca. 1869.

18. The West Coast Fresh-Water Univalves, No. 1. Pr. C. A. S., IV, 93-101. A synopsis of 43 pulmonate species. 1870.

**Ancylus caurinus* W. Cp. is here described. See No. 1.

**Planorbis occidentalis* n. sp.

19. On a New Californian Helicoid Land Shell. Am. J. Conch., V, 196-7, Pl. 17, fig. 8. 1870.

Daedalochila harfordiana n. sp.

20. Notes on West Coast Land Shells, No. II. Am. J. Conch., V, 199-219. 1870. Additions to paper No. 15, with classification of the Helices of the West Coast.

21. Notes on Mollusca of Monterey Bay, California. Am. J. Conch., VI, 42-70. 1870. A list of 197 species, with notes.

22. Additions and Corrections to the Catalogue of Monterey Mollusca. Am. J. Conch., VI, 321-2.

23. Note on *Gadinia* and *Rowellia*. Am. J. Conch., VI, 319, 320.

24. Note on *Waldheimia pulvinata* Gld. Am. J. Conch., VI, 320.

25. Monterey in the Dry Season. Am. Nat., IV, 756-8. References to the Mollusca.

26. Catalogue of the Invertebrate Fossils of the Western Slope of the United States. Part II. San Francisco, 1871. 30 pages. Intended merely as a check-list and for labels, supplementing the Geographical Catalogue of 1867.

27. On Shells of the West Slope of North America. No. 1. Pr. C. A. S., IV, 150-6, notes on 51 species; No. II, IV, 171-5, notes on 34 species.

28. On New Californian Pulmonata, etc. Proc. Acad. Nat. Sci., Phila., 1872, 143-154, Pl. 3.

**Limax (Amalia) hewstoni* n. sp. **Assiminea californica* n. sp.

**Limax campestris* Binney, var. **Alexia setifer* n. sp.

occidentalis n. var.

**Arion?* *andersoni* n. sp.

**Ariolimax californicus* n. sp.

**Lysinoe diabloensis* n. sp.

**Ariolimax niger* n. sp.

29. On the Law of Variation in the Banded California Land Shells. Pr. C. A. S., V., 121-5, Pl. VII, VIII. 1873.

30. Note on *Alexia setifer* and its Allies. Pr. C. A. S., V., 172. 1873.

31. California During the Pliocene Epoch; in the Miocene Epoch; The Eocene Epoch in California; Note on Tertiary Formation of California. Pr. C. A. S., V, 389-392, 401-404, 419-421, 422. 1874.

32. The Origin of California Land Shells. Pr. C. A. S., VI, 12-14. 1875.

33. On Shells of the West Slope of North America. No. III. Pr. C. A. S., VI, 14-27. 1875. Notes on about 75 species. See No. 27.

34. The Age of the Tejon Group, California. Am. Jour. Sci., 3d ser., vol. 14, 321-2. 1877. From Pr. C. A. S., Nov., 1874.

35. Notes on Some Land Shells of the Pacific Slope. Proc. Am. Phil. Soc., XVIII, 282-288. 1879. Notes on about 30 species.

36. On Fossil and Sub-Fossil Land Shells of the United States, with Notes on Living Species. Bull. C. A. S., I, No. 4, 235-255. 1885.

37. West Coast Pulmonata; Fossil and Living. Bull. C. A. S., II, No. 7, 355-376 and map; Bull. C. A. S., II, No. 8, 497-514; Pr. C. A. S. (2), I, 11-24. 1887.

38. Catalogue of Californian Fossils. Cal. State Mining Bureau, 7th Ann. Rep. State Mineralogist, 221-308. 879 species of Mollusca, with geographical range of those in the list now living. 1888.

39. Fresh-Water Mollusca of San Francisco County. Zoe, I, 196-7. 1890.

40. The Value of Fossils as Indications of Important Mineral Products. 9th Ann. Rep. State Mineralogist, 284-6. 1890.

41. Notes on the Subalpine Mollusca of the Sierra Nevada, near lat. 38° (with Plate I), by W. J. Raymond. Additional Notes and Descriptions of New Species by J. G. Cooper, M. D. Pr. C. A. S. (2), III, 61-69 and 70-91. 1890.

Primella n. subgen. (of *Sphærium*).

Sphærium raymondi n. sp.

Ancylus caurinus W. Cp., var. *subalpinus* n. var.

Planorbis subcrenatus Cpr., var. *dissectus* n. var.

42. On Land and Fresh-Water Shells of Lower California. No. 1. Pr. C. A. S. (2), III, 99-103. 1891.

Bulimulus inscendens W. G. B., subsp. *bryanti* n. subsp.

Rhodea californica Pf., subsp.? *ramentosa* n. subsp.

43. The same, No. 2. Pr. C. A. S. (2), III, 207-217. 1892.

Bulimulus inscendens W. G. B., var. *beldingi* n. var.

Bulimulus sufflatus Gld., var. *insularis* n. var.

Columna ramentosa J. G. C. replaces *Rhodea* subsp. *ramentosa*.

Columna ramentosa J. G. C., var. *abbreviata* n. var.

Helix areolata Pf., var. *exanimata* n. var.

44. The same, No. 3. Pr. C. A. S. (2), III, 338-344, Pl. XIII, XIV. 1893. Fuller descriptions and figures of species named in 1 and 2.

Melaniella ? *eiseniana* n. sp.

Planorbis anitensis n. sp.

Planorbis peninsularis n. sp.

Helicodiscus lineatus Say, *sonorensis* n. subsp.

45. The same, No. 4. Pr. C. A. S. (2), IV, 130-143, Pl. V, VI. 1894.

Bulimulus (*pallidior*?) *vegetus* Gld., var. *vegerspiza* n. var.

Melaniella tastensis n. sp.

46. The same, No. 5. Pr. C. A. S. (2), V, 163-5. 1895.

Bulimulus decipiens n. sp.

Pliocolumna n. gen.

47. Catalogue of the Land and Fresh-Water Mollusca of Lower California. Zoe, III, 12-25. 1892.

48. Catalogue of Californian Fossils. Bull. No. 4, Cal. State Mining Bureau, 65 pages and Pl. I-VI. 1894. See No. 38.

Part II. Bibliography and References. Includes many titles of papers on Recent Shells. Part III. Additions to the Catalogue of Californian Fossils Obtained since 1888. Part IV. Remarks on Fossils Collected by Dr. S. Bowers. Part V. Descriptions and Figures of New Species. Thirty-seven new species Cretaceous and Cretaceous B (or Eocene). See p. 7.

49. Catalogue of West North American and Many Foreign Shells. Printed for the State Mining Bureau. Also a complete list of Mollusca known to inhabit the West Coast of North America, from Sitka, Alaska, to Cape St. Lucas, and inland to the Rocky Mountains, north of Mexico. 1894.

50. On Some Pliocene Fresh-Water Fossils of California. Pr. C. A. S. (2), IV, 166-172, Pl. XIV. 1894.

Margaritana subangulata n. sp.

51. Catalogue of Marine Shells, collected chiefly on the eastern shore of Lower California. Pr. C. A. S. (2), V, 34-48. 1895. List of 191 species.

52. On West Mexican Land and Fresh-Water Mollusca. Pr. C. A. S. (2), V, 166-9. 1895. Seventeen species and varieties.

53. On Some New Cretaceous (and Eocene?) Mollusca of California. Pr. C. A. S. (2), VI, 330-337, Pl. XLVII, XLVIII. 1896.

Sistrum cretaceum n. sp.

Triplicosta n. subgen.

Littorina subobesa n. sp.

Pholadomya (*Triplicosta*) *pro-*

Calliostoma lignitica n. sp.

gressiva n. sp.

Sigaretus costotus n. sp.

No. 48. Bull. 4, Cal. State Mining Bureau. Cretaceous and Eocene species :

<i>Terebra watsiana</i> n. sp.	<i>Fusus supraplanus</i> n. sp.
<i>Surcula crenatospira</i> n. sp.	<i>Mitra simplicissima</i> n. sp.
<i>Surcula monilifera</i> n. sp.	<i>Stomatia intermedia</i> n. sp.
<i>Surcula inconstans</i> n. sp.	<i>Calliostoma kempiana</i> n. sp.
<i>Pleurotoma perkinsiana</i> n. sp.	<i>Tornatella normalis</i> n. sp.
<i>Pleurotoma decipiens</i> n. sp.	<i>Bulla assimilata</i> n. sp.
<i>Drillia ullreyana</i> n. sp.	<i>Tornatina erratica</i> n. sp.
<i>Mangilia suturalis</i> n. sp.	<i>Siphonaria capuloides</i> n. sp.
<i>Cordiera gracillima</i> n. sp.	<i>Astarte semidentata</i> n. sp.
<i>Cancellaria irelaniana</i> n. sp.	<i>Crassatella lomana</i> n. sp.
<i>Ancilla</i> (<i>Oliverato</i>) <i>californica</i>	<i>Cucullæa bowersiana</i> n. sp.
n. subgen., n. sp.	<i>Corbula triangulata</i> n. sp.
<i>Bittium longissimum</i> n. sp.	<i>Mytilus dichotomus</i> n. sp.
<i>Cerithium fairbanksi</i> n. sp.	<i>Crenella santana</i> n. sp.
<i>Potamides carbonicola</i> n. sp.	<i>Megerlia dubitanda</i> n. sp.
<i>Potamides davisiana</i> n. sp.	<i>Waldheimia imbricata</i> n. sp.

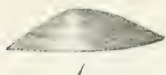
Miocene and Pliocene species :

<i>Agasoma barkerianum</i> n. sp.	<i>Anodonta</i> (<i>nuttalliana</i>) <i>lignitica</i>
<i>Trophosyon kernianum</i> n. sp.	n. var.
<i>Limnæa contracosta</i> n. sp.	<i>Amnicola yatesiana</i> n. sp.
<i>Planorbis pabloanus</i> n. sp.	

GENERAL NOTES.

A NEW BRITISH VITREA.—In the last (April) number of the *Journal of Conchology*, Mr. B. B. Woodward describes a new *Vitrea* from Cheshire, *v. rogersi*. It stands near *v. alliaria* and *v. helvetica*, and has been identified also as *v. glabra*. It is named for the late Mr. T. Rogers of Manchester, who first (1870) found British specimens.

ERRATA.—Owing to the absence of both editors from Philadelphia during the printing of the April number, some typographical errors escaped correction on the proofs. On p. 136, 4th line, the first word should be Hiezian. In the second paragraph on p. 137, the second word should be *largillierti*, and the 16th line from bottom of same page should begin with a capital M. On p. 139 the term *Pelecypods* is misspelled. There are also some other like errors.



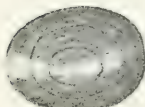
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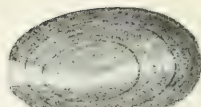
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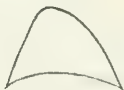
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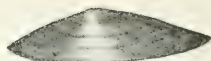
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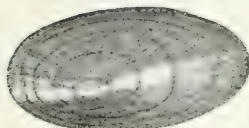
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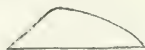
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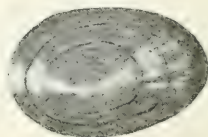
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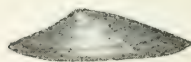
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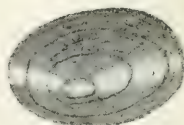
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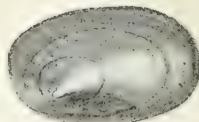
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THE NAUTILUS.

VOL. XVII.

JUNE, 1903.

No. 2.

NOTES ON EASTERN AMERICAN ANCYLI.

BY BRYANT WALKER.

An attempt to determine the *Ancyli* of Michigan leads necessarily to a critical study of all the species described from the States east of the Mississippi. The following notes embody the results of the investigation, and are published in the hope of stimulating a more active interest in this most perplexing and little understood group.

The amount of material examined has been considerable. In addition to that in my own collection, which includes the Jas. Lewis, DeCamp and Lothrop collections, I have had the entire collections of Dr. V. Sterki, Dr. R. J. Kirkland, A. A. Hinkley, Jas. H. Ferriss and Geo. H. Clapp, and through the kindness of Dr. Pilsbry a suite of seventy-three trays from the collection of the Philadelphia Academy of Natural Sciences. I am also indebted to Dr. Pilsbry for examining the type of *Ancylus haldemani*, which corrected my previous conception of that species, and established the validity of the species described as *A. kirklandi*. I am also under obligations to Messrs. Frank C. Baker and Henry Hemphill for valuable material.

The lack of authentic examples of many of the rarer species has been a source of great embarrassment. But by process of elimination and careful study of the original descriptions, it is believed that in most cases the difficulty has been successfully overcome.

In studying the *Ancyli* well cleaned specimens are the prime requisite. They can then be easily separated in the two sections

characterized by the smooth or striate apex. In differentiating the species in these groups, the shape and contour of the shell are the main elements to be relied upon, the sculpture of the surface being an exceedingly variable factor, which, by itself, cannot in most cases be considered a specific character. As in all fresh-water forms, a very large degree of variation must be allowed for. But in spite of this, it is believed that nearly all the described species should be allowed to stand, and, although in certain instances it is not always possible to determine the exact specific relations of particular specimens, yet, as a rule, the lines between the different forms can be drawn with a reasonably satisfactory degree of certainty.

Bourguignat, in his "Notice sur le genre *Ancylus*," in 1853 (J. de C. IV., p. 63), divided the genus into two subgenera: *Ancylastrum*, with the apex inclined to the right, and *Velletia*, with the apex inclined to the left.

Clessin (1882), in the Conchlien Cabinet, considered these two groups to have only a sectional value. He also restricted *Ancylastrum* to the Eurasian species which group around *A. fluviatilis*; and with the exception of *A. fragilis* and *oregonensis*, which he referred to *Velletia*, and the large western *A. newberryi* and *patelloides*, which he placed in a new genus, *Lanx*, included all the North American species in a separate group, *Haldemania*, which he characterized as follows: "Shell conical, apex not bent backwards and only slightly removed from the centre-line of the shell, aperture round or oval. Type *A. obscurus* Hald."

Unfortunately *Haldemania* is preoccupied, having been used by Tryon in 1862 (Proc. P. A. N. S., 1862, p. 95) for the group of *Viviparidæ* now known as *Lioplax*, so that his very appropriate name cannot be retained.

As has already been shown (NAUTILUS, XVI., p. 85), the North American species included in Clessin's *Haldemania* are divided into two natural groups, characterized by the presence or absence of apical sculpture. These groups are, at least, of sectional value, and must be recognized.

Owing to the uncertainty which still prevails as to just what Haldeman's *obscurus* really is, and the consequent inability to say with accuracy to which group that species belongs, it does not appear desirable to retain *obscurus* as the type of either section. Whenever an examination of Haldeman's type shall definitely determine where

the species belongs, *Haldemania* can be written as a synonym of that group. Until this is done, the matter must rest in abeyance.

Leaving the position of the western species, which are outside the scope of this paper, for future consideration, I propose to divide the eastern American species of *Ancylus* into two sections, characterized as follows:

1st. *Lævapex*, sec. nov.

Shell usually depressed, apex obtuse or sub-acute, smooth. Type: *A. fuscus* Ads.

2. *Ferrissia*, sec. nov. *See page 16 vol. III*

Shell usually elevated, apex acute, radially striate. Type: *A. rivularis* Say.

Section Lævapex.

This section includes all the larger species of *Ancylus*, which are characteristic of the lakes and slow-flowing streams of the northern States, the Mississippi Valley and Florida. They are usually found on the reeds, dead leaves and submerged timber in such localities, and are rarely, if at all, found on stones, dead shells, etc., in rapidly flowing streams, where they are replaced by the species of the section *Ferrissia*. With the exception of *A. diaphanus* and, possibly, *A. obscurus*, the species of this group seem to be wholly lacking in the mountain streams of the Appalachian region between the Ohio river and Florida.

I. *ANCYLUS FUSCUS* Adams (1840). Pl. I., figs. 1-9.

Adams' description calls for a large depressed, elliptical shell, moderately curved at the sides, with a moderately prominent, obtuse apex, slightly behind and to the right of the middle; $7\frac{3}{4}$ mm. long, $4\frac{1}{2}$ wide and $1\frac{1}{4}$ high. No mention is made of the outline of the slopes. Haldeman states that all these are rectilinear, while Gould describes the shell as regularly convex. None of these authors refer to the surface sculpture. But subsequent writers have assumed that the surface was smooth.

Specimens answering these requirements are common, and show that the species has an extensive range from Massachusetts west, at least, to the Mississippi Valley and south to New Orleans. I have not seen any specimens from Kentucky, Tennessee, the South Atlantic or the Gulf States east of Louisiana.

The very limited amount of material examined from Massachu-

setts, none of which is typical in size, does not show any considerable variation in the contours of the shell. But in the west, where it is an abundant species, there is considerable variation in this respect.

In 1896 (NAUTILUS, IX., p. 139), Dr. Pilsbry described a shell similar in shape, though narrower and higher, with the surface ornamented with "very fine, somewhat irregular, radial striæ, more distinct toward the periphery" as *A. eugraptus*.

The large amount of material examined has forced me to the conclusion that *eugraptus* is only a ribbed form of *fuscus*. In almost every considerable number of specimens, all the variations can be found from those with a smooth surface, through those with the surface more or less radially rippled, to those with the fine ribs of typical *eugraptus*. This variation in the sculpture is not confined to the western specimens. In two sets of *A. fuscus* from Winchester, Mass., in different collections, which, so far as shape and contour is concerned, are entirely typical, the surface varies from the typical smooth *fuscus* to examples with as well developed ribs as the majority of the western *eugraptus*. Nor are the western specimens of *eugraptus* uniformly higher and narrower than the typical eastern examples of *fuscus*. While, perhaps, they average higher than the eastern specimens, they vary insensibly from the depressed form of typical *fuscus* to elevated specimens higher than the typical *eugraptus*, so that I have not seen my way clear to separate the eastern from the western form on any substantial difference in shape.

Assuming the Massachusetts form to be typical *fuscus*, it may be described as a depressed, oval or slightly obovate shell, with the left side more arcuate than the right; anterior and right slopes straight, posterior and left slopes slightly convex; apex very obtuse, not rising above the general outline of the shell, smooth, slightly behind and to the right of the middle. Translucent horn-color, shining. Surface with faint growth lines, otherwise smooth or with irregular and discontinuous transverse ripples which tend to form irregular radial riblets.

From central New York to the west there appears to be a much greater degree of variation. The shells tend to become narrower and more elevated, and with a greater convexity to the left slope. But throughout the peculiar, rounded, obtuse apex remains as a valuable specific characteristic in differentiating it from *A. kirklandi*, *diaphanus* and *obscurus*.

One peculiar form can, I think, be traced directly to the habitat of the animal. In nearly every lot of western shells are to be found a number of specimens, very narrow and elongated, with both of the lateral sides decidedly convex and with the sides nearly parallel. When placed on a flat surface the shell rests on the middle of the side and the ends are elevated and arched, giving a trough-shaped appearance to the shell, when placed apex downward. Now, *fuscus* is a dweller upon reeds and other aquatic vegetation. When it lives on the flat side of a reed or leaf it grows normal in shape and the peritreme touches the surface all the way around. But when it lives on a round reed such as *Scirpus lacustris*, which is narrower than the full grown shell, it adapts itself to its position and grows to fit the reed, the ends following the convex surface of its support and the sides lapping down around the reed itself.

The dimensions of the specimens figured are as follows :

Fig. 1. Length 5.5, width 4, alt. 1.25 mm.

Fig. 4. Length 7.25 width 4.5, alt. 1.75 mm.

Fig. 37. Length 8.25, width 4.5, alt. 3 mm.

Variable within the limits above specified, nevertheless, *A. fuscus* is a consistent and well defined species, which need not be confused with any of its allies. It differs from *A. kirklandi* by its more depressed and more regularly oval shape and more nearly central, more obtuse, less prominent and less eccentric apex; from *A. diaphanus* by its elongated, oval shape and more obtuse apex and from *A. obscurus* by its more depressed, less acute and more central apex and straight posterior outline.

Var. *eugraptus* Pilsbry (1896), Pl. I., figs. 10-15.

Typically slightly narrower and considerably higher than the typical *fuscus*, but subject to great variation in this respect. Figures 10-12 from New Orleans and 13-15 from Reeds L., Kent Co., Mich., represent the extremes. Surface with "very fine, somewhat irregular radial striae, more distinct toward the periphery."

Type: length 6, width 4, alt. 1.8 mm.

Fig. 10. Length 7, width 4.75, alt. 1.8 mm.

Fig. 13. Length 7.25, width 4.25, alt. 2.25 mm.

II. ANCYLUS DIAPHANUS Hald. (1841). Pl. II., figs. 13-18.

This is a well marked species and, in all the localities where the typical form is found, seems to be very constant in its characters and

subject to less variations than many of the other species. For this reason I hesitate to refer to it the more elliptical forms from the western States, which are usually referred to it, but which seem to me rather referable to *A. kirklandi*, and until a larger amount of material shall have demonstrated the identity of these shells with the typical form, prefer to restrict the species to the author's type, "distinguished by its circular and flattened form and central inconspicuous apex." As thus limited, it is found in the Delaware river at Easton, Pa., the Ohio river at Pittsburg and Edgeworth, Pa., the Illinois river, the Tennessee river at Knoxville, Tenn., and the Holston river, Tenn. The specimens from the last locality are those quoted without identification by Lewis in his paper "On the Shells of the Holston River" (*A. J. of C.*, VI., p. 222), and later referred to "*haldemani*?" (*Proc. P. A. N. S.*, 1872, p. 110). Haldeman's description, though brief, is quite to the point, and leaves little to be added. It may be said, however, that the apex is smooth, the surface smooth or delicately shagreened with fine transverse ripples, which in none of the specimens examined become sufficiently raised or connected to be called ribs; the anterior and left slopes are slightly convex, the posterior and right nearly straight; the left side is usually more arcuate than the right and often decidedly so, the general shape, however, even then remaining subcircular. There is some little variation in height as shown by the figures, and, in the more elevated examples, the shell is less circular, the anterior and left slopes become more decidedly convex and the apex rather less central, being, as it were, tipped backward by the more rapid growth and greater convexity of the anterior portion of the shell. The largest examples seen are from the Ohio river at Edgeworth, Pa., collected by Mr. George H. Clapp. Those from the Holston and Tennessee rivers are decidedly smaller, the example measured from the Holston being exactly typical in size.

Fig. 13. Length 7, width 5.5, alt. 2 mm.

Fig. 16. Length 7.5, width 5.5, alt. 2.5 mm.

Holston River. Length 5.5, width 4.5, alt. 2 mm.

Tennessee River. Length 5, width 4, alt. 2.

Explanation of Plate I.

All the figures are drawn on the same scale. The outline figures are transverse sections through the apex or point of greatest altitude.

Figs. 1-3. *A. fuscus* Ads., Winchester, Mass.

Figs. 4-6. *A. fuscus* Ads., Grand River, Kent Co., Mich.

Figs. 7-9. *A. fuscus* Ads., Black Lake, Ottawa Co., Mich.

Figs. 10-12. *A. fuscus eugraptus* Pils., New Orleans, La.

Figs. 13-15. *A. fuscus eugraptus* Pils., Reeds L., Kent Co., Mich.

Figs. 16-18. *A. obscurus* Hald., Volusia Co., Fla.

Figs. 19-21. *A. excentricus* Mor., Barton Creek, Travis Co., Tex.

(To be Continued.)

TWO NEW SPECIES OF EOCENE FOSSILS FROM THE LIGNITIC OF ALABAMA.

BY T. H. ALDRICH.

UMBRACULUM (EOSINICA) ELEVATUM n. sp. Fig. 1.

Shell small, outline ovate, depressed conic, substance rather thin, apex partially immersed, pointed backwards to the left. Surface of shell with numerous radiating folds, strongest at the margin, gradually becoming weaker and dying out some little distance from the apex, a few concentric striæ or growth lines showing one-fourth the distance down from the apex; interior smooth, polished, rather pearly, the apical point marked by a rounded pearly protuberance; interior margin fluted. Longest diameter, 18 mm., width 12 mm., height 5 mm.

Locality. Wood's Bluff, Ala., lignitic stage.

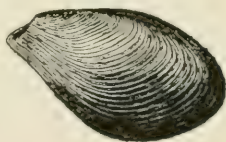
The type is in the State Museum. This shell resembles a limpet,

FIG. 1.



UMBRACULUM ELEVATUM.

FIG. 2.



GASTROCHAENA STRIATULA.

and has some of the characters of *Tylodina* Raf., but I consider it an *Umraculum* somewhat like *U. plicatulum* Martens from Cuba. The interior of our species is very different. It should be placed in a

new subgenus, *EOSINICA*, which may be described as ovate-conic, radially ridged, interior smooth, terminating in a rounded protuberance and interior margin generally crenulated.

GASTROCHÆNA STRIATULA n. sp. Fig. 2.

Shell small, substance thin, ventral opening large, ovate anteriorly and pointed at posterior with its margin turned outward towards the anterior end of shell. The shell is pointed anteriorly, rounded posteriorly with surface closely concentrically striated. Widest part of valve 6 mm., length 10 mm.

Locality. Wood's Bluff, Ala. This specimen was found imbedded in a coral, and unfortunately was broken. The cavity is rounded and smooth. It is rather wider and shorter than usual in this genus.

Part of type in my collection, balance in State Museum.

NEW PISIDIA.

BY V. STERKI.

Pisidium ohioense n. sp.

Mussel minute, equipartite, well inflated, elliptical in outline; beaks in the middle, rather broad, rounded, prominent over the hinge line; superior margin little curved or almost straight, with slightly marked, rounded angles at the scutum and scutellum; the other margins rounded or the posterior subtruncate; surface somewhat shining, horn colored, very finely and irregularly striate, usually with a few coarser lines of growth; shell thin, translucent; nacre glassy-transparent, muscle insertions slightly marked; hinge fine, plate narrow, cardinal teeth fine, lamellar, the right slightly curved, abruptly thickened and bifid at the posterior end, the left anterior longitudinal, almost straight, the posterior slightly oblique or longitudinal and parallel with the anterior and extending to over about its middle; lateral teeth comparatively stout, their cusps pointed, the outer ones of the right valve small but well formed; ligament rather stout.

Size: Long 2.5, alt. 2-2.1, diam. 1.5 mill.

Long 2, alt. 1.6-1.7, diam. 1.2-1.4 mill.

Long 1.8, alt. 1.5, diam. 1.3.

Young: Long 1, alt. 0.8, diam. 0.3 mill.

Habitat : A pond near Garrettsville, Portage Co., Ohio ; a brook near Indian mounds, and a very small stream, Kent Co., Michigan.

In December, 1901, Mr. Geo. J. Streater collected several hundred specimens, most of them immature and young. They were regarded as a new species and named, but not published, waiting for more materials. Since then Dr. R. J. Kirkland has secured over three hundred specimens from the first named place in Michigan, and half a dozen from the latter. Last March Mr. Streater has again found a number of examples at Garrettsville, O. Most of the specimens were incrustated with a ferruginous or blackish coating, sometimes very thick.

This *Pisidium* is remarkable for the position of the beaks, which are not posterior, a feature also found with *Pis. medianum*. The species is somewhat variable in regard to size and shape ; the largest specimen seen was 2.7 mill. long, and moderately inflated. There is a more different form, found among the Ohio and Michigan specimens, averaging smaller, 1.7–2.0 mill. long, comparatively shorter, well inflated, with the anterior part a trifle longer than the posterior, the anterior end subangular, the supero-anterior slope being slightly marked, and the color is somewhat lighter.

In one specimen of the more typical form from Michigan, the beaks are low, flattened on top, or rather impressed, and with concentric, elevated ridges around the flattened areas, somewhat like those of *Pis. ferrugineum* Pr.

Pis. mainense n. sp.

. Published as *Pis. walkeri* St. var. *mainense* St. in the NAUTILUS, XII., p. 79. Since then numerous specimens were collected in Michigan by Dr. R. J. Kirkland from Reed Lake, Green Lake, Pine Island Lake and Little Bostwick Lake, and proved distinct from *P. walkeri*, which is widely distributed and fairly constant. *Pis. mainense* is considerably smaller, less elongate, less oblique, the anterior and posterior parts are less disproportionate in size. The hinge is of rather the same character as that of *walkeri*, but in the specimens examined from both Maine and Michigan, the left anterior cardinal tooth is rather longer, and the cusps of the laterals are more abrupt, especially so in the left valve.

Size : Long 3, alt. 2.6, diam. 2.

Long 3.5, alt. 3, diam. 2.3.

Long 3.7, alt. 3.1, diam 2.2 (L. Bostwick Lake).

The original specimens had been collected at several places in Aroostook Co., Me., by Mr. Olaf O. Nylander.

Pis. costatum n. sp. (fossil).

Mussel small, somewhat oblique, strongly inflated, with three or four concentric, prominent ridges on each valve; beaks rather posterior, large, much projecting over the hinge margin, flattened on top with a sharp, prominent concentric ridge around the flattened part; outline of the valves rather oval or ovoid, with the supero-anterior slope somewhat less curved, the anterior end subangular and the posterior end subtruncate; surface with fine, irregular striæ and lines of growth between the ridges; shell rather thin; hinge rather short, stout and compact, plate moderately broad, and short, cardinal teeth well formed, the right slightly curved, thicker at the posterior end, the left anterior large, almost straight, ascending obliquely and the lamella strongly curved up, its posterior part projecting over the inferior edge of the plate; the posterior rather parallel with the anterior and extending over about two-thirds of the latter; lateral teeth close to the cardinals and the ligament, short, those of the right valve stout, pointed, the outer ones very slight, especially so the anterior, the grooves short and deep, the left laterals moderately stout, high, pointed; ligament short and strong.

Size: Long 2.5, alt. 2.1 (with the beaks), diam. 2.3 mill.

Fossil in a marl bed at Monitor, Bay Co., Michigan, in company with other *Pisidia*, collected and sent for examination by Mr. Bryant Walker.

This species seems to stand near *Pis. ventricosum* Pr., but its beaks are less posterior, and the outlines are rather different. It also resembles *P. scholtzii* Cless. as described and figured, with the flattened beaks. This feature, however, does not seem to be constant. In two specimens of *P. scholtzii* which I owe to the kindness of Mr. Clessin, the beaks are slightly "calyculate," but not flattened on top. Also in a few younger valves of *P. costatum*, the beaks are less flattened, and the ribs slighter.

A PROPOSED STUDY OF GONIOBASIS.

LAWRENCEBURG, IND., MAY, 1903.

EDITORS OF THE NAUTILUS:

For many years I have been under the impression that the infor-

mation that now exists and is at the command of the conchologist, in reference to the genus *Goniobasis*, both in the form of labeled collections and literature, is in such shape as to be practically useless to the average collector for the following reasons :

1st. That the local collectors and students have in their collections recorded species and varieties of species, many of which are entirely due to local surroundings, and which should not be recognized, as they now are, as distinct species. These have never been brought together in numbers sufficient to allow of a proper estimate as to their value as separate species.

2d. That the individual study of this family, in many cases without the means of comparing large numbers of so-called species and varieties, has resulted in much confusion and caused a prevalent erroneous conception of their value as species.

3d. That the great difficulty which the study of this family presents, the liability to error, and the dislike of any one to publish work which may afterwards prove to be wrong, has deterred many from putting forward their individual information, which would be of great value when used in connection with a mass of similar information from other sources.

With these facts before me, I believe that some step ought to be taken to at least do something to throw additional light on this large genus of North American mollusks.

My idea is as follows ; Take George W. Tryon's *Strepomatidæ* of North America, use his list of the *Goniobasis* as a basis, and build up a monograph of the genus on the foundation and along the lines laid down by him.

Many "species" very closely related in geographical distribution are named as such simply from a variation of color, a variation which exists in almost every known species to a greater or less degree.

With a large collection of my own, with the opportunity of examining several others of fair dimensions and containing large series of *Goniobasis*, and with a tolerably large proportion of the existing literature at hand, I am satisfied that with the generous help of others interested in this matter I may undertake the task, hoping that some good end may be obtained. I propose to send out to all students of the subject lists of all the described species of the genus *Goniobasis*, requesting them to correct such lists to the best of their judgment and ability, and to supply me by exchange or loan with

sufficient material, and with such information as may tend to satisfactorily solve all questions that may arise. By this means I might hope to accumulate sufficiently ample and valuable information to serve for the eventual publication of an up-to-date work on the subject.

Yours truly,

A. C. BILLUPS.

PUBLICATIONS RECEIVED.

NOTES ON PROSOBRANCHIATA, NO. I, LOTORIUM. — By H. Leighton Kesteven. Proc. Linn. Soc. of New South Wales, 1902, Pt. 3, pp. 443-483, pl. xvii.

This interesting paper again brings before us the old genus *Triton*, which, being pre-occupied, has long been abandoned in Mollusca, but regarding a substitute there seems to be a very diversified opinion. The author has gone thoroughly over the ground, adopting *Lotorium* Montfort, as proposed by Harris (Catl. Tertiary Moll. in Brit. Mus., Pt. 1, 1897).

Montfort's names are the earliest that can be considered (Conch. Syst., ii, 1810). *Aquillus* (type *M. cutaceus* Linn.) appears on page 579, and *Lotorium* (type *M. lotorium* Linn.) on page 583. The right to amend *Aquillus* to *Aquilus* and to discard it on grounds of uncertain etymology is questionable; still its similarity to *Aquila* makes the name less desirable than *Lotorium*, and as only a few pages intervene between the two names, it seems a small matter to discuss, still strict ruling would probably make *Aquillus* the generic name.

The author does not agree with Dr. Dall and Simpson (Moll. of Porto Rico, p. 416), who by elimination makes *Septa* Perry, 1811, the type genus of the family *Septidæ*, and recognizing three other genera, *Ranularia* and *Lampusia* Schumacher, 1817, and *Lotorium* Montf.

The author's statement that, "the whole of the species included by Tryon in *Triton* (*sensu strictu*), *Simpulium*, *Cymatium* and *Gutturnium*, form one natural genus," is apparent to any one who has made a study of all the species based solely on conchological characters.

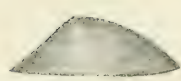
From the figure of Perry's *Septa rubicunda*, and the habitat "New Holland" assigned, I should consider it *T. australe* Lam. and not *T. nodiferus* Lam. The apices of twenty-nine species are described and figured.—C. W. J.



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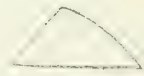
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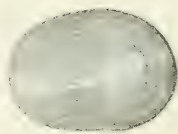
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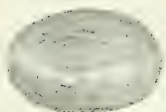
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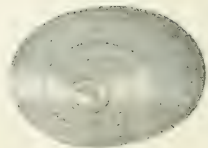
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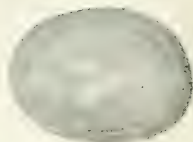
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THE NAUTILUS.

 VOL. XVII.

JULY, 1903.

 No. 3.

NOTES ON EASTERN AMERICAN ANCYLI.

 BY BRYANT WALKER.

III. ANCYLUS OBSCURUS Hald. (1844). Pl. I, fig. 16-18.

I am in great doubt as to the identification of this species. Haldeman's type, a single specimen, came from the Nolachucky River, below Greenville, Tenn. It has been cited from Jamaica by Adams, from St. Thomas and Porto Rico by Shuttleworth and from Guadeloupe by Fischer. The citations of Crosse (J. de C., xl, p. 38) and of Dall and Simpson (U. S. Fish Com. Bull., i, p. 371) of this species in their catalogues of Porto Rico mollusca, are based wholly on the original citation of Shuttleworth. Both Bourguignat and Clessin question the West Indian localities and Mazé in his "Catalogue révisé des mollusques terrestres et fluviatile de la Guadeloupe," etc. (J. de C., xxxi, p. 29, 1883), states that he had neither found it there himself nor seen it in any of the local collections. More recently, Dr. W. H. Dall has quoted it from several localities in Florida (Proc. U. S. Nat. Mus., 1885, p. 273).

Haldeman compares the type with *A. ricularis* and *haldemani* and his outline figure justifies the comparison.

Clessin's description is substantially taken from Haldeman, the dimensions given being the same. But his outline figure is quite different and he has modified his description to agree with his figure, placing the apex in the last third of the length and calling it "very obtuse" instead of following the author's statement "apex but slightly projecting, rather more than one-third of the shell posterior." He

quotes no other localities than those of Haldeman, Adams, Shuttleworth and Fischer. His figure is so decidedly different from Haldeman's that it would seem to have been drawn from an actual specimen, but he does not so state. He also compares *obscurus* with *diaphanus*, saying that it differs only by its more posterior apex.

Pilsbry, in his description of *A. eugraptus* (NAUT. ix, p. 139), compares that species with both *fuscus* and *obscurus*.

These are the only references to *obscurus* that I have been able to find. The only specimens I have seen, which are at all referable to this species, are in the collection of A. A. Hinkley, from Volusia county, Florida, and are said to have been identified by Dr. Dall. There are eleven specimens in this lot, of which six are *A. peninsulae*, the remainder are quite different and may be *obscurus*. At the time Dr. Dall's paper was published, *A. peninsulae* had not been described and, if these specimens were identified by him, the mixture of the two forms raises a query not only as to which form he identified with *A. obscurus*, but also in regard to the identity of the specimens referred to that species from the several Floridan localities quoted in his paper. Both of the forms represented in the Hinkley lot are characteristic, wide, depressed *Lævapices* and such as would be expected from a lake country, being closely related to *A. fuscus*. As has already been stated, the only species of *Lævapex* from the region from which Haldeman's type came, that has been clearly identified, is *A. diaphanus*. With that exception, all the *Ancylus* seen from that region belong to the section *Ferrissia*. This fact, taken in connection with Haldeman's figure and his comparison of *obscurus* with *rivularis* and *haldemani*, raises a very serious doubt in my mind whether the Floridan specimens referred to have been correctly identified. It certainly seems remarkable that so acute an observer as Haldeman should have made such a comparison, if he had before him a shell similar to those of the Hinkley lot.

I regret that I have not been able to have Haldeman's type examined critically in regard to the apical characters. When that is done, I should not be at all surprised if it proved to be a genuine *Ferrissia*. In the meantime, it seems best to describe and figure the Hinkley shell, as it may be represented in other collections under this name, leaving the question of its identity with Haldeman's species for future determination. When cleaned, the shell is a light yellowish horn-color, shining, very thin, fragile and transparent;

depressed, quite regularly oval in shape, the left side being rather more arcuate than the right; apex subacute, though not much elevated behind the middle of the shell and decidedly turned to the right; the anterior slope is nearly rectilinear, the right and left somewhat convex above, concave below and flattening out toward the periphery; the posterior slightly concave; surface with the lines of growth faint but quite regular, slightly rippled transversely or with fine radial ribs (in two of the five specimens examined, radial ribs are developed as strong as in *A. fuscus cingrapus*). Length (fig. 16) 6.5, width 4.5, alt. 1.5 mm.

It will be observed that while this shell is larger and more depressed than the typical *obscurus*, the proportion of the length to the breadth is almost exactly the same. The longitudinal outline, however, is much nearer to Clessin's figure than it is Haldeman's.

The affinities of this form are with *A. fuscus*, *kirklandi* and *peninsulæ*. It is, however, more closely related to *kirklandi* than to the others and possibly may prove to be a southern development of that species. It differs, however, by its more depressed, narrower and more regularly oval shell, and the peculiar concavo-convex outline of the lateral slopes. From *fuscus*, it differs decidedly in contour by reason of the more posterior, more prominent and more excentric apex and the peculiar lateral slopes. The shape and color are so entirely different, that there is no reason to confuse the ribbed form with *A. peninsulæ*, which is found associated with it.

IV. *ANCYLUS EXCENTRICUS* Morelet (1851). Pl. 1, fig. 19-21.

This species is the sole representative in the United States of a group of general distribution in the West Indies, Mexico and Central America, characterized by the prominent, rather obtuse and very excentric apex and, usually, well-developed radial ribs over the surface. The only recorded localities are Comal Creek, New Braunfels, and Barton Creek, Travis county, Texas. Specimens from the latter locality, collected by Singley, are before me and are larger than those from Comal Creek, cited by Pilsbry (NAUT. iii, p. 64), and agree almost exactly with the dimensions given by Morelet, the size of the specimen figured being, length $7\frac{1}{2}$, width $4\frac{1}{2}$, alt. 2 mm. *A. excentricus* is so entirely different in shape from all other North American species that there is no possibility of confusing it with any of them. Another peculiarity of this species is the depression of the

apex. In all other North American species the apex is the point of greatest altitude, but in *eccentricus*, the highest point of the shell is anterior to the apex.

There is some question as to the specific validity of this form. Bourguignat (J. de C. iv, p. 175) considered it to be only a variety of *A. radiatus* Guilding, characterized by the apex being slightly more acute. And in this, he has been followed by Clessin (Conch. Cab., *Ancylus*, p. 67). Crosse and Fischer (Miss. Sci. Mex., ii, p. 37) state that it differs from *radiatus* by its thinner shell, more pointed and more excentric apex and the absence of the radiating striae, and on this account prefer to recognize it as distinct, although admitting that the two forms are very close to each other. Von Martens (Biol. Cent. Am., p. 402) also describes the shell as "without radial sculpture" and considers it distinct. Pilsbry, in his notice of the New Braunfels specimens, however, mentions slight indications of most delicate riblets radiating from the apex. All of the five specimens from Barton Creek have the radial ribs more or less developed. In most of them the ribs are stronger along the antero-lateral slopes, the median portion being nearly smooth or only slightly rippled. In one example, however, the well-developed ribs extend over the entire anterior slope.

Under these circumstances, the approximation of the Texan shells to *A. radiatus* seems very probable. Whether this is also the case with the typical form from Guatemala, must remain uncertain until authentic material can be critically studied. I have not been able to make any comparison of the Texan specimens with *radiatus*.

V. *ANCYLUS PENINSULÆ* Pilsbry & Johnson (1896). Pl. II,
figs. 19-21.

This beautiful species, which is readily distinguished by "its large size, broadly oval and depressed form, blunt apex and the dense radial striation," is apparently peculiar to the inland waters of Florida, where it seems to be very generally and abundantly distributed. In addition to the original locality, the St. John's River, specimens have been seen from Volusia and Manatee counties and from Lake Jessup, which indicate a general range over the state. It is possible that some of the localities cited by Dall for *A. obscurus* (Proc. U. S. Nat. Museum, 1885, p. 273) belong to this species.

VI. *ANCYLUS KIRKLANDI* n. s. Pl. II, figs. 1-12.

Shell large for the genus, thin, translucent, horn-colored; broadly oval or obovate, sides nearly equally curved, ends broadly rounded; quite elevated; apex subacute, behind and to the right of the middle, and decidedly turned to the right; posterior and right slopes straight or slightly concave, anterior slope quite convex, left slope decidedly convex; surface with the growth lines regular and distinct and more or less rippled by transverse wrinkles, which frequently tend to form feeble, irregular radial riblets.

Fig. 1 (type): Length 8, breadth $5\frac{1}{2}$, alt. 2.5 mm.

Grand Rapids, Mich.: Length 9.25, breadth 5.5, alt. 2.5 mm.

Grand Rapids, Mich.: Length 8.25, breadth 5, alt. 2 mm.

Hardy, Arkansas: Length 6.50, breadth 5, alt. 2 mm.

Fig. 4: Length 6, breadth 4.50, alt. 2 mm.

Fig. 7: Length 5.75, breadth 4, alt. 2 mm.

Fig. 10: Length 5.25, breadth 3.25, height 2 mm.

This fine large species is a well-defined one and has wide range, extending from Trenton, N. J., west to Hardy, Ark. The specimens from the last locality were cited as *A. haldemani* by Pilsbry (Proc. P. A. N. S., 1900, p. 457), and, from this identification, that species was placed among those with smooth apices in the NAUT. xvi, p. 88. A recent examination by Dr. Pilsbry of the type of *A. haldemani* has shown that that species has a striate apex and, therefore, does not belong in *Lavapex* at all. *A. kirklandi* is distinguished by its large size, decidedly elevated shape and its prominent, subacute apex, which is decidedly turned to the right. There is some considerable variation in shape, as shown by the above measurements, some examples being more elongated with nearly parallel sides. There is also considerable difference in height. But in all cases the subacute, prominent apex and the convex, left slope are characteristic, and always distinguish it from *fuscus*, in which the apex, even in the more elevated examples, is always bluntly rounded and the left slope scarcely convex.

Kirklandi is more nearly related to the Florida shell herein referred to as *obscurus* than to any other species, but differs by its broader form, greater elevation, more acute and more eccentric apex and greater convexity of the left lateral slope.

The finest specimens of *kirklandi* come from Grand River, Kent county, Mich., where they have been collected in great abundance

by Dr. R. J. Kirkland, after whom the species is named. The Arkansas specimens collected by Ferriss are nearly as large. Toward the east the species seems to diminish rapidly and uniformly in size to an extent which would almost justify their recognition as a varietal race. Ohio specimens (fig. 4), collected in considerable numbers by Dr. V. Sterki, are uniformly smaller than the type, while those from Roaches Run, opposite Washington, D. C., and the Potomac River at Alexandria, Va. (figs. 7-10), are still smaller than those from Ohio. A single example in the collection of the Phil. Academy from Trenton, N. J., is similar to these, but slightly larger. Were it not for the intermediate character of the Ohio shells, these specimens would probably be considered a distinct species, characterized by their small size, proportionately higher and narrower shell and more convex anterior slope. But as shown by the figures, the larger and wider Virginian shells grade indistinguishably into the Ohio form, as that does into the immature specimens of the still larger typical form. That this difference in size is a local peculiarity is shown by the fact that in the considerable amount of material collected by Dr. Sterki, both in Ohio (several localities) and in the Potomac and its tributary, Roaches Run, near Washington, not a single specimen was obtained which by its greater size would seem to indicate that the balance of the specimens obtained were immature shells. There are also several trays in the Academy's collection from "Washington" similar to those collected by Dr. Sterki. From Michigan and several other western localities, occasional small and medium sized, high, narrow specimens have been noticed which, though larger, seem indistinguishable from the corresponding eastern form (fig. 10). But these do not seem to be persistent varieties in any one locality, being usually associated with the usual form of *kirklandi*; but rather sporadic individuals which for some reason have failed to develop normally. It is the occurrence of such specimens, together with the inability to find any marked specific character in the eastern forms, except the difference in size, that has caused me to refrain from giving them varietal rank until additional material shall give a better opportunity to pass upon the exact relations to these various forms.

PLATE II.

Figs. 1-3. *A. kirklandi* Walker (type), Grand River, Kent Co., Mich.

Figs. 4-6. *A. kirklandi* (var.), Tuscarawas R., New Philadelphia, Ohio.

Figs. 7-9. *A. kirklandi* (var.), Roaches Run, opp. Washington, D. C.

Figs. 10-12. *A. kirklandi* (var.), Roaches Run, opp. Washington, D. C.

Figs. 13-15. *A. diaphanus* Hald., Ohio R., Edgeworth, Pa.

Figs. 16-18. *A. diaphanus* Hald., Ohio R., Edgeworth, Pa.

Figs. 19-21. *A. peninsulæ* P. & J., Volusia Co., Fla.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Japonia sadoensis n. sp.

Shell umbilicate, conic, dull dark brown; sculpture of very delicate, thread-like oblique striæ, widely and irregularly spaced, and numerous regularly spaced spiral cuticular threads, which bear rather long hairs, very easily rubbed off, being preserved only on the latter part of the last whorl in some specimens, wholly lost in others. Whorls $4\frac{1}{2}$, very convex, the last tubular. Aperture oblique, circular, the peristome thin, continuous, in contact with the preceding whorl for a very short distance above; columellar margin slightly expanded. Alt. 4, diam. 4.7 mm.

Niibo-mura, Sado. Types no. 84768 A. N. S. P.

This species is clearly distinct from *J. barbata* and *citharella* Gld., described from Oshima in the Riukiu group, and *J. musiva* Gld., of unknown locality. Dr. von Möllendorff has recognized Gould's *J. barbata* in specimens collected by Mr. F. W. Eastlake in the Hakone mountains (Journ. Asiat. Soc. Beng. liv, 1885, p. 67); this gives another Japanese locality for the genus, but in view of the geographic separation, I think that the Hakone form will prove different from that described by Gould from Oshima.

Chloritis tosanus n. sp.

Shell umbilicate, slightly convex above, convex beneath, very thin, fragile and chestnut-brown; densely sculptured with very short, darker, curved hairs, arranged in oblique lines as usual, but a little

irregular in some places. Whorls $4\frac{1}{2}$, very convex, separated by a deep suture, the last whorl large, rounded at the periphery and beneath. Aperture broadly lunate, slightly oblique. Peristome thin and unexpanded, suddenly dilated and recurved at the axial insertion, half covering the umbilicus. Alt. 10, diam. 17 mm.

Shiujo-mura, Tosa. Type no. 84415 A. N. S. P., from no. 1015 of Mr. Hirase's collection.

It is similar to *C. perpunctatus*, but nearly twice the size. In *C. fragilis* the hairs stand about twice as far apart as in this species, which is the first *Chloritis* from Shikoku Island.

Kaliella xenica n. sp.

Shell minutely perforate, pyramidal, much higher than wide, the spire with nearly straight lateral outlines and very obtuse apex; thin, yellowish, faintly and finely striate. Whorls $6\frac{3}{4}$, slightly convex, the last obtusely angular at the periphery, convex beneath. Aperture broadly lunate, the peristome thin, columellar margin reflexed. Alt. 3.7, diam. 2.7 mm.

Shukunegimura, Sado. Type no. 84762 A. N. S. P., from no. 1041 of Mr. Hirase's collection.

This species resembles *K. præalta* in general shape, but its outlines are noticeably more convex, the apex is more obtuse, and there are fewer whorls. (Xenikos, strange.)

A PROPOSED STUDY OF GONIOBASIS.

BY A. A. HINKLEY.

The article in the June NAUTILUS, under the above heading, by Mr. A. C. Billups, was read with interest. It is time something should be done to bring this interesting group of shells out of the present chaotic condition. The work will be difficult, owing to more or less variations in all the species and the wide geographical distribution of some, together with the meager description often given and sometimes drawn from only two or three specimens; added to this, some of the types are inaccessible or lost.

There are twenty-four species of *Goniobasis* listed in G. W. Tryon's monograph on *Strepomatidae* as being found north of the Ohio River or in that stream, viz.:

<i>G. intersita</i> Hald.	<i>G. infantula</i> Lea.
<i>G. suturalis</i> Hald.	<i>G. louisvillensis</i> Lea. ³
<i>G. costifera</i> Hald.	<i>G. pulchella</i> Anth.
<i>G. cubicoides</i> Anth.	<i>G. gracilior</i> Anth.
<i>G. spartenburgensis</i> Lea.	<i>G. translucens</i> Anth.
<i>G. iota</i> Anth. ¹	<i>G. interlineata</i> Anth.
<i>G. tecta</i> Anth.	<i>G. ohioensis</i> Lea.
<i>G. gibbosa</i> Lea. ²	<i>G. brevispira</i> Anth.
<i>G. depygis</i> Say.	<i>G. semicarinata</i> Say.
<i>G. livescens</i> Menke.	<i>G. haldemani</i> Tryon.
<i>G. milesii</i> Lea.	<i>G. informis</i> Lea. ⁴
<i>G. lithasioides</i> Lea.	<i>G. virginica</i> Gmel.

The specific value of some of the above is doubtful, and to settle points in question will require large series of specimens, preferably from the localities where the types were found. I would suggest that any one who can do so, collect such a series, including all stages of growth, make a note of the situation where found, and send the same to Mr. Billups, if he decides to go ahead with the work.

I am sure some new species will be found, but I hope no specimens will be described as new until their validity is well established.

If the different groups of the *Strepomatidæ* could be studied as thoroughly as *Io* has been by Mr. Chas. C. Adams, a large share of the doubtful species could be eliminated. There are other species which show nearly as great a variation as the *Io*; for instance, *Pleurocera canaliculatum* Say has a wide variation in form and varies from a smooth surface to one with two well-developed grooves on the body-whorl. *Angitrema armigera* Say is also quite variable in both form and tubercles, some specimens having a row of double tubercles on the periphery of the body whorl. I am strongly of the opinion that the specimens described by Dr. Lea as *Meseschiza grosvenorii* were young *Ang. armigera* Say; his description and figure fits many of the young of that species, excepting for the notch, which is probably abnormal, as Tryon held. *Angitrema duttoniana* Lea and *Lithasia downiei* Lea may only be variations of *Ang. armigera* Say; specimens I have collected in Tennessee seem to indicate it.

¹ Ohio? see Amer. Jour. of Conchology.

² Described from two specimens and said to be a "remarkable species."

³ Described from two imperfect specimens.

⁴ Described from two specimens.

I would like to see an interest taken in this neglected group of mollusca.

DESCRIPTIONS OF NEW SPECIES OF ACHATINELLIDÆ FROM THE
HAWAIIAN ISLANDS.

BY D. D. BALDWIN.

Amastra henshawi n. sp.

Shell dextral, imperforate or subperforate, solid, ovately conical, apex subacute; surface lusterless, striated with somewhat irregular lines of growth; embryonic whorls under a lens showing very delicate radiating sulcations. Color varies from light to very dark brown, the upper whorls generally much darker than the body whorl; the lower whorls with traces of a deciduous, brown epidermis. Whorls 6, somewhat convex, the last one with a light carination at the periphery; suture well impressed. Aperture ovate, a little oblique, livid white within; peristome acute, slightly thickened within, extremities united with a thin, livid-white parietal callosity; columella white, flexuous, abruptly terminating in a thin lamellar plait.

Length 18, diam. 10 mm.

Habitat: South Kona, Island of Hawaii.

Found in damp woods at the roots of ferns and nearly buried in trash, at altitudes of from 1,800 to 4,000 feet.

We take pleasure in dedicating this shell to Prof. H. W. Henshaw, formerly of the Smithsonian Institution, Washington, D. C. He discovered both this and the following species. The Professor is at present a resident of Hilo, Island of Hawaii, and his explorations are contributing largely to our knowledge of the land fauna of this island.

Amastra saxicola n. sp.

Shell dextral, imperforate, rather solid, elongately ovate-conic, apex subacute; surface lustreless, sculptured with delicate growth lines; embryonic whorls smooth and polished. Color reddish-brown, tending to lighter shade on the middle whorls; apex pearly white; destitute of the usual fugacious epidermis of this genus. Whorls 7, slightly convex; suture well impressed. Aperture ovate, a little oblique, pinkish within. Peristome simple, acute, not thickened within, extremities joined by a very thin, pinkish parietal callosity;

columella white, flexuous, terminating in a moderately-developed lamellar plait.

Length $20\frac{1}{3}$, diam. 10 mm.

Habitat: Kau, Island of Hawaii.

This shell seems to live among and under rocks to an unusual degree. It is found on old lava flows attached to the under side of rocks, or in loose soil and trash at the base of bunch grass growing on lava flows. The locality is very arid.

Amastra senilis n. sp.

Shell fossil, dextral, deeply perforated, the perforation penetrating to the apex; moderately solid, globose with a short conical spire, apex acute; surface sculptured with coarse, irregular growth lines, with a few irregular cross striae or ridges on the three lower whorls; embryonic whorls under a lens exhibiting delicate and regular sulcations. Color of the living shell unknown. Whorls 7, convex. Aperture sinuately oval, a little oblique; peristome simple, acute, not thickened within, extremities joined by a thick parietal callosity; columella terminating in a slight, flexuous fold.

Length 23, diam. 18 mm.

Habitat: Hamakua, Island of Hawaii.

This and the following species were discovered and sent to me by Mr. Eugene Horner, of Paauila, Hawaii. They were found at a place called Palihoukapapa on the Hamakua slope of Maunakea, at an elevation of 4,000 feet. The shells were imbedded in the earth about one foot below the surface.

Prof. Henshaw reports other similar localities on the island of Hawaii where there are extensive deposits of fossilized land shells about a foot below the surface of humus. Nearly all the known genera of Hawaiian land shells are represented in these deposits by species, some still extant, others probably now extinct. The deposit of earth above the fossilized shells indicates several hundred years antiquity.

Amastra fossilis n. sp.

Shell fossil, dextral, minutely perforated, somewhat solid; elongately conical, apex rather acute; surface striated with somewhat irregular growth lines; embryonic whorls under a lens exhibiting very delicate and regular sulcations. Color of living shell unknown.

Whorls 7, slightly convex. Aperture oblique, ovate; peristome simple, very thin, columellar margin slightly expanded over the umbilicus; columella terminating in a flexuous thread-like plait.

Length 18, diam. 9 mm.

Habitat: Hamakua, Island of Hawaii.

This shell in shape resembles some of the forms of *Amastra turritella* Fer., which is found on the island of Oahu.

NOTES AND NEWS.

We have lately learned, through Mr. Charles Hedley, of the death of two New Caledonian conchologists—RICHARD ROSSITER, on January 16, 1903, aged 62 years, and JULIEN BERNIER, March 3d, at the age of 55 years. Both died at Noumea. Rossiter formed a large collection of shells, and supplied the types of many new forms to the editors of the *Journal de Conchyliologie*, to John Brazier, of Sydney, N. S. W., his brother-in-law, and to Dr. W. D. Hartman, of West Chester, Pa. His collection will probably be acquired by the Colonial Museum at Noumea. Julien Bernier was Clerk to the local Parliament of New Caledonia, and founded the "Musée Colonial" at Noumea. Some of his material has been described in the *Journal de Conch.* and elsewhere. *Placostylus bernieri* Hartman, and various other species discovered by him, preserve his memory.

A NEW PLEUROTOMARIA.—Mr. Y. Hirase, of Kyoto, Japan, has recently discovered a new species of *Pleurotomaria*, related to *P. beyrichi*, from which it differs in having much more numerous, distinctly beaded spiral cords. In shape and color it resembles *P. beyrichi*. The new form will be described under the name *Pleurotomaria hirasei*.—H. A. PILSBRY.

ASHMUNELLA THOMSONIANA COOPERÆ.—I have just found this form living in abundance at Pecos, New Mexico. The greatest diameter of five specimens measured is 16, 15, 15, 15, 15½ mm., thus averaging larger than the original specimens. The basal tooth is single, with at most a faint indication of doubling.—T. D. A. COCKERELL.

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No. 4.

TWO NEW MOLLUSKS FROM THE WEST COAST OF AMERICA.

BY WILLIAM HEALEY DALL.

The National Museum has received through the kindness of Mr. J. S. Arnheim, of San Francisco, several interesting shells collected by Capt. William Noyes, of San Francisco, of which two appear to be undescribed.

Sigaretus noyesii n. sp.

Shell depressed, mottled purplish brown above, pale or nearly white below, pale purplish with two obscure revolving brown bands internally, nucleus minute, two-whorled, translucent, subsequent whorls two, rapidly enlarging; surface with obvious incremental lines, and faint, very fine, partially obsolete, spiral striation; covered with a yellowish silky periostracum; suture distinct but not impressed; axis rather widely pervious, body with a slight, transparent coat of callus; pillar lip hardly thickened or reflected, general form gibbous; alt. 10, major diam. 36, minor diam. 26 mm.

Gorgona Islands, Colombia, in the Gulf of Panama.

This species is a West American analogue of *S. maculatus* Say, of the east coast, which is more solid, more convex, with much more conspicuous spiral sculpture, and has the coil of the whorls impervious or nearly so.

Tonicia arnheimi n. sp.

Shell small, back rather rounded, girdle narrow, naked, yellow brown; color pale pink with pale brown dotting, two white lines en-

closing a dark brown streak on the dorsal keel of the intermediate valves; eye spots with a metallic silvery lustre; anterior valve with seven, posterior with eight notches, the teeth radially striate; intermediate valves with one lateral notch on each side; interior coloration pinkish white with a magenta axial streak; sculpture much like that of *T. crenulata* Sowerby, but central areas with much sparser riblets and no defined central smooth area, the sutural crenulations stronger and forming a wider band, the pleural rugæ mostly fore and aft in direction, the second valve larger than the rest and with a more conspicuous mesial smooth area. Interior with sinus square not denticulate. Anterior and posterior plates with obscurely radial pustules and very numerous eyes. Length 15, lat. 7, height 4 mm. in the dried animal.

Noyes Cove, Narborough Island, Galapagos Group, in 20 fathoms; Capt. Noyes.

This species is clearly of the group of *T. crenulatus* but is separated by sufficiently distinct characters. The brilliancy of the eye spots, each situated in a deep, minute pit, is very remarkable. There are on this small creature nearly 1000 of them.

PLEISTOCENE MOLLUSKS OF WHITE POND, NEW JERSEY.

BY FRANK C. BAKER.

The Chicago Academy has recently received from Dr. Stuart Weller, Paleontologist of the University of Chicago, a collection of Pleistocene mollusks from the marl beds of White Pond, near Marksboro, New Jersey. The material consists of about a quart of mixed shells, which, when studied quantitatively, gave some interesting results. *Valvata* and *Amnicola* made up ninety-five per cent. of the entire lot, the former being forty-five and the latter fifty per cent. Of the remainder, *Planorbis bicarinatus* made up two per cent., *Planorbis campanulatus* one per cent., and the rest of the species the other two per cent. *Aplexa* was the rarest, there being but two specimens in the entire lot.

I am indebted to Mr. Bryant Walker for assistance in determining some of the material. The list of species is as follows:

Pisidium compressum Prime. Normal.

Amnicola limosa Say. Very variable and abundantly represented.

Amnicola galbana Haldeman. This characteristic fossil is very abundant in the White Pond formation. It shows some variation in the height of the spire, but seems to be easily separated from *A. limosa*. Several monstrosities of *galbana* were found in this collection; two were scalariform and the others (6) had the spire variously contorted, like the forms of *Planorbis complanatus* figured by European conchologists. One specimen had the spire almost concealed by the gibbous last whorl. Monstrosities seem to be rare, as only eight were found in a lot of over two thousand specimens.

Valvata tricarinata Say, var. *confusa* Walker. This is nearly as abundant as the *Amnicolas*. Only a small percentage of the specimens were typical *confusa* with two well-defined keels, the majority having the basal keel strongly developed, the upper part of the whorl being rounded. In some specimens the two keels are so strong that they form elevated ridges.

Physa ancillaria Say. - Not uncommon.

Aplexa hypnorum Linne. Two specimens of a small *Aplexa* which seems referable to *hypnorum* are in the collection.

Planorbis campanulatus Say. Typical, but not abundant.

Planorbis bicarinatus Say. Many specimens of this species show a tendency to form spiral lines, similar to those on var. *striatus* Baker.

Planorbis deflectus Say. Common and typical.

Planorbis exacutus Say. But one specimen of this species was found.

Limnæa galbana Say. Not common.

Limnæa humilis Say. Not common.

Succinea retusa Lea. Not common.

ON CATALOGUING A COLLECTION OF SHELLS.

BY MRS. M. BURTON WILLIAMSON.

When I began to catalogue my shells I used a ledger blank book, but in time the book looked untidy, as the space was not sufficient for the addition of species new to the collection that from time to time

were added to it. Then I copied the whole list, leaving space for the introduction of species not listed. But in some cases the blank spaces were not needed while more space was required for families and genera not represented in the book. Again I copied the entire catalogue, excepting the west coast species which I listed on cards to form a card catalogue. In time this second book began to look far from neat, so I tried a new plan. I used "Ward's Catalogue of the Mollusca," marking with a small mark such species as I had, and inserted blanks between the printed leaves for species that were not found in the price list; but this made the pamphlet rather bulky and also necessitated my looking over two lists, the printed one and the written one, in order to find if I had certain species. The plan was satisfactory at first, then I thought out a better one which I will give you.

I used a patent cover for blank leaves such as students use for laboratory notes, examination papers, etc., in colleges and schools. I bought paper the proper size for the cover, about eight by ten inches. This paper had holes stamped out at the right place for the metal clasps to be inserted. I use ruled paper, as names and localities are quickly seen on the same line, but this is a matter of taste, as dots can mark the space between names of shells and their localities.

The classification is a matter of choice. I use the same as that found in "Tryon's Structural and Systematic Conchology" for marine shells, excepting the west coast shells, for which I use another classification. My reason for using Tryon's is, if I get a shell from a family new to me I know where to list it immediately by referring to the Systematic Conchology, for by constantly studying and referring to this work I have become tolerably conversant with the classification.

I wrote only on one side of the paper when making out this new list, and paged only this side. This left a blank opposite each page to be used if the page became full. This blank page I numbered alphabetically to correspond with the numbered page. For example, if I required the blank leaf opposite page 5, I numbered it 5^a, and if I found it necessary to add new leaves at this place they would be paged 5^b, 5^c, 5^d, etc. on the left page, on the right 5¹, 5², 5³, etc. The possibility of adding new leaves, one after another, or of taking out and rewriting the leaves is the strong feature in favor of using these covers. The use of the alphabet, or as much of it as is needed

in conjunction with the figures, makes repaging from time to time unnecessary when the book is enlarged.

At the front of this catalogue I have an index of genera arranged alphabetically. By indexing according to genera much space is saved and it does not take much time to refer to the page for species if one does not remember just where the species may be found in the classification.

For the use of beginners I will tell how I list specimens on a page. After leaving space at the left hand of each page for the binding of the leaves with the metal clasps, I write the name of the shell, by whom named and the locality all upon one line, keeping the locality of each species at the extreme right hand of the page. At the left hand I write the initials or some letter to indicate from what source the shell or shells were received, also the number of specimens. Above the name of the genera and species I write the name of the family in large letters. I use red ink for this, as the family name is more prominent in this way. As noted before, if the space for the specific name becomes too crowded I write upon the opposite page the name of the specimen I desire to list, indicating this upon the page where the others are listed. As they are listed specifically according to the alphabet the place assigned to it upon the blank page is the same as upon the page that is filled.

For West Coast shells, as before mentioned, I use cards. When a new specimen is listed upon a new card it is placed with the names of the rest of the genus. Any data desired are written upon each card. I got my cards cut and a hole punctured in each one by the thousand.* All cards for the specific name are the same size, those for the families and genera have an offset at the top. That is, a raised margin was left at the top of each card, these were raised sometimes at one end sometimes at the other end, and others had the margin in the center. When genera are listed upon a few cards the raised margins would hide each other if they were not placed at a little distance from each other, but if one generic name is at the extreme right hand of the row of cards in the box or drawer, another in the middle, still another at the extreme left hand, these generic names are readily detected by the eye, whereas if they followed one another all in a row some would be hidden from sight.

* It is best to use the cards of the Library Bureau, as they are of uniform size and quality.

NEW NORTH AMERICAN PISIDIA.

BY V. STERKI.

Pisidium ashmuni n. sp.

Mussel somewhat elongate, moderately inequipartite; scarcely oblique, moderately inflated; superior and inferior margins moderately curved, supero-anterior slope curved down to the rounded anterior end situated well below the median line; posterior end subtruncate, with more or less of an angle at the scutum; beaks somewhat posterior, rather broad, rounded, moderately elevated over the hinge margin; surface shining, with microscopic, shallow, rather regular, crowded striae, and one or a few impressed lines of growth: color pale horn, shell translucent, thin; hinge slight, plate narrow; cardinal teeth rather long, fine, lamellar, the right curved with its anterior end much shorter and situated much higher up on the plate than the posterior which is somewhat thickened; left anterior of the same shape as the right, rather hook-like at its anterior end, the posterior oblique, slightly curved and passing over about two-thirds of the anterior; lateral teeth rather long, produced far beyond the pointed cusps; outer laterals of the right valve slight but distinct; ligament rather slight.

Size: Long. 2.8, alt. 2.3, diam. 1.6 mill.

Long. 2.3, alt. 1.9, diam. 1.4 mill.

Most specimens are intermediate.

Habitat: San Rafaels, New Mexico, collected by Rev. E. H. Ashmun, in whose honor the species has been named.

Pis. ashmuni ranges under the *abditum* group. It is easily recognized, being of about the same size with *Pis. splendidulum* St. It is more elongate and its beaks are broader.

Pisidium danielsi n. sp.

Mussel slightly inequipartite, moderately and regularly inflated, outlines nearly short oval; all margins well curved, or the posterior subtruncate, anterior end rounded, rather below the median line; angles at the scutum and scutellum not marked in most specimens, slightly so in some; umbones little posterior, low, slightly projecting over the hinge margin, moderately broad, each with a depression below the apex and above a slightly raised, concentric ridge; surface with somewhat coarse, subregular and sharp striae, and a few coarser

lines of growth, rather dull and microscopically rugulose; color grayish white to yellowish horn, in some specimens slightly plumbeous around the beaks; shell moderately thick, naere white, muscle insertions distinct but not impressed; hinge rather stout, plate rather broad; right cardinal tooth strongly curved over a deep excavation, its posterior part thickened and grooved to bifid, the left anterior strongly curved and rather massive, placed rather high up on the plate, the posterior oblique, curved, its anterior part reaching to or over the middle of the anterior; lateral teeth stout, the cusps rather short, the outer ones in the right valve rather small but well formed; ligament strong.

Size: Long. 4.5, alt. 3.9, diam. 2.6 mill.

Habitat: Marsh from a spring on Lake James, Steuben Co., Indiana, numerous specimens collected by Mr. L. E. Daniels, of the Indiana Geological Survey, in whose honor the species is named. During the season of 1902 Mr. Daniels has collected many and interesting *Pisidia* and *Sphæria*, especially in northern Indiana, a section from which very little had been known.

The present species has some resemblance with—typical—*Pis. strengii*, but in the latter species the outlines are more angular, the beaks narrower and more prominent and rounded, the striation is finer, and the hinge slighter. *Pis. danielsi* is of special interest. From the features of the surface, the beaks and the hinge, there is no doubt but that it ranges under the same group with *P. compressum*, *kirklandi*, *cruciatum*, *fallax*, etc., although the rounded outlines, the low beaks, and the moderate and regular convexity would suggest rather the contrary at first sight. Young specimens, however, have an unmistakable similarity of the outlines with those of *Pis. compressum* Pr. In some of the specimens the beaks are broader, and the depression and ridge are less marked or almost obsolete, just as it is with certain forms of *Pis. compressum*.

Pisidium obtusale C. Pfr.

At the same place as the preceding Mr. Daniels has collected numerous specimens which are distinct from all North American species described, but exactly like *Pis. obtusale* from several places of Europe, and appear to be identical with that species. They are rather large and almost globular; long. 3.6, alt. 3.1, diam. 2.6 mill. It is to be expected that the same will be found also at other places.

NOTICES OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota (Euhadra) euterpe n. sp.

Shell umbilicate, depressed, the upper surface low-conic, lower surface convex. Last $1\frac{1}{2}$ whorls *white under a thin yellow cuticle*, which is in part worn off in the type specimen; the *periphery marked with a narrow dark chestnut band*, the edge of which appears above the suture of the penultimate and last whorls; the inside of the umbilicus of the same dark color; *inner whorls red-brown*, the apex whitish. Surface rather glossy, rather closely plicate-striate above, somewhat smoother below the periphery. Whorls 6, slightly convex, regularly and slowly increasing, the last scarcely descending in front, *distinctly angular at the periphery*, the angle almost disappearing just below the lip. Aperture oblique, lunate, white and showing the brown band within, peristome *reddish-brown*, a little thickened within, the upper margin slightly expanded, the outer and basal margins reflexed, columellar margin dilated. Alt. 24, greater diam. 39, lesser 34.5 mm.

Prov. Kunchan, Riukiu. Type no. 1078 of Mr. Hirase's collection.

This very handsome *Euhadra* belongs to the group of *E. mercatoria*. It is similar to that species in the umbilicus and shape of the peristome, and the slow, regular increase of the whorls; but it differs from *mercatoria* in the depression of the whole shell, the more angular periphery, the finer and closer sculpture, and in coloration. Only one specimen has been received.

Eulota (Plectotropis) marginata n. sp.

Shell broadly and openly umbilicate, convexly low-conic above, convex beneath, solid and strong; light brown, surface lustreless, sculptured with irregular growth-wrinkles only. Whorls 7, but slightly convex, slowly and regularly increasing, separated by a slightly impressed suture which is distinctly margined above. Last whorl slightly descending in front, acutely carinate at the periphery, the keel *narrowly impressed on both sides*; base convex, not angular around the umbilicus, but very suddenly curving into it. Aperture oblique, nearly as high as wide; the peristome slightly thickened

within, white, noticeably grooved at the position of the keel, below which it is more thickened, expanded and narrowly reflexed. Alt. 14, diam. 27, width of umbilicus 6.5 mm.; width of aperture 11, oblique alt. 10.5 mm.

Kunchan, the northern province of Riukiu Island. Type no. 84924 A. N. S. P., from no. 1080 of Mr. Hirase's collection.

A large, solid species, with the keel margined on both sides, and projecting a trifle at the suture.

Eulota (Aegista) friedeliana var. *peraperta* n. v.

Differs from *friedeliana* from Nagasaki, the type locality, in the more widely open umbilicus and the noticeably smaller aperture in shells of the same size. Alt. 9, diam. 17 mm.; width of umbilicus 5.5 mm.

Isshochi, Higo. Type no. 84925 A. N. S. P., from no. 343a of Mr. Hirase's collection.

Eulota (Plectotropis) conomphala n. sp.

Shell umbilicate, depressed, low-conic above and below the acute peripheral keel. Thin, light brown, nearly lustreless, slightly striated with growth lines, and showing very fine, close, rather indistinct spiral lines under a lens, obsolete in places. On the upper surface there are sparse, short cuticular processes, easily rubbed off. Whorls $6\frac{1}{2}$, slowly widening, nearly flat, the keel of the last whorl bearing a fringe of cuticular filaments, triangular at their bases. Base angular around the deep, conic umbilicus. Last whorl very little descending in front. Aperture oblique, the upper margin of the peristome simple, basal margin thin, very narrowly reflexed; columellar margin dilated above. Alt. 9.5, diam. 19.5 mm.

Yakujima, Osumi. Type no. 84926 A. N. S. P., from no. 905a of Mr. Hirase's collection.

A very distinct, thin species, noticeably bi-conic in shape, and angular around the regularly conic umbilicus. It is an interesting addition to the fauna of Yakujima.

Hirasea planulata n. sp.

Shell imperforate, discoidal with rounded periphery and level upper surface. Yellowish brown, dull and very densely, very finely radially striate above, becoming smooth and glossy beneath. Spire

almost level, but the inner whorls are very slightly sunken. Whorls $5\frac{1}{2}$ to $5\frac{3}{4}$, convex, slowly widening, the last falling a little to the aperture and noticeably contracted at the lip; the base impressed in the middle as usual. Aperture nearly vertical, narrowly crescentic, the lip thickened within by a strong white rib. Alt. 1.8, diam. 3.5 mm., or a little smaller, alt. 1.4, diam. 3.2 mm.

Hahajima, Ogasawara. Type no. 82976 A. N. S. P., from 849b of Mr. Hirase's collection.

This was formerly thought to be a small form of *H. biconcava*, but the study of additional specimens of both show *H. planulata* to be constantly smaller, with a nearly level spire, while in *biconcava* the spire is conspicuously sunken.

Kaliella incensa n. sp.

Shell almost imperforate, depressed, the spire very low, conic, the base convex, periphery rounded in fully mature shells; thin, yellow, translucent and smoothish, under a strong lens seen to be minutely and closely striate obliquely above, the striæ decussate on the earlier whorls, the base smooth.

Whorls $3\frac{3}{4}$, but slightly convex, the last nearly double the width of the preceding. Aperture slightly oblique, lunate, the peristome thin, columellar margin suddenly dilated and reflexed near the axial insertion. Alt. 1.6, diam. 2.8 mm.

Hakusan, Kaga. Types no. 84788 A. N. S. P., from no. 973a of Mr. Hirase's collection.

A small species with few rather wide whorls, the last one rapidly widening. The columellar lip is more oblique than usual. It might be placed in *Microcystina*, but it has the sculpture of *Kaliella*. (*Incensus*, unrecorded.)

Kaliella harimensis var. *sadoensis* n. var.

This variety is somewhat larger than *K. harimensis*. It also resembles *K. okiana*, but the columellar margin is less widely dilated. It is from Shukunegimura, Sado; types no. 84764 A. N. S. P., from no. 1034 of Mr. Hirase's collection.

GEORGE T. MARSTON.

We regret to announce the death of our friend and correspondent, George Terence Marston. He was born in Chicago, Jan. 31, 1867. When he was five years of age his father died and his widowed mother moved to De Pere, Wisconsin. He attended the public schools and graduated from the high school at the age of fourteen years. He immediately found employment in a bank at De Pere, but was soon called to a position of higher responsibility in a bank at Green Bay. Here his ambition and tempermental intensity of nature led him to overwork, and after a few years he resigned his position and sought to regain his health by a vacation at the seaside.

He came to Quincy in 1891 and was employed in the bank of the State Savings Loan and Trust Company. His clear mind, industry, mastery of the principles of business and a rare talent for the accurate and systematic management of details, made him a valued and trusted man.

Though compelled to devote himself to business, his special delight was in scientific studies, especially conchology. He had collected and had in his cabinet specimens of nearly every species found in Wisconsin, and cherished a hope of some day being able to have the time to prepare a work on the mollusks of that State.

His last work was in photographing the embryological development of the snail, with some very good results. Among his contributions to the NAUTILUS was an article on the occurrence of *Helicina occulta* Say, in Brown county, Wis.

He was married to Helen E. Collins, daughter of W. H. Collins, Oct. 3, 1898, who with two children survives him.

GENERAL NOTES.

REVIEW OF THE CLASSIFICATION OF THE CYRENACEA. By William H. Dall. Proc. Biol. Soc., Wash., vol. xvi, pp. 5-8, 1903.

In working over the *Cyrenacea* for the Memoir on the Tertiary Fossils of Florida, Dr. Dall found the nomenclature and classification of this super-family in much confusion, and while the details are

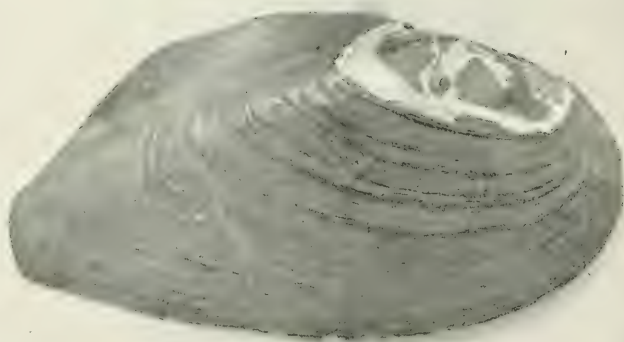
reserved for the memoir a synopsis of the arrangement adopted has been given in this pamphlet, which deals with the families of *Cyrenidæ* and *Sphæriidæ*.

In the *Cyrenidæ* twenty-three proposed genera, subgenera and sections are listed and type specimens with synonyms are given; to these Dr. Dall has added one new genus and four new sections. Of the genus *Donacopsis* Sandberger, 1872, he says: "I suspect this to be merely a subdivision of *Cyrena*."

Of the family *Sphæriidæ* fourteen genera, subgenera and sections are listed with type specimens. Section *Cyclocalyx*, subgenus *Cymatocyclas*, and subgenus *Tropidocyclas* are new. The three types are *Pisidium scholtzii* Clessin, *P. compressum* Prime, and *P. henslowianum* Sheppard.

"*Pera* Leach, and *Euglesa* Leach, 1852, are synonymous with *Corneocyclus* s. s.," and *Galileja* Costa; *Euglesia* Leach, 1840; *Pisum* Gray, 1847, not Megerele, 1811; *Cordula* Leach; *Fluminina* Clessin; *Cycladina* Clessin, and *Rivulina* Clessin, are, according to Dr. Dall, not separable from *Pisidium* s. s.—MRS. M. BURTON WILLIAMSON.

LAND SHELLS OF CURACAO.—In Mr. Smith's useful review of the land shells of this island (Proc. Malac. Soc., London iii, 113) several species seem to have been overlooked: *Cionella gloynii* and *Succinea gyrata*, both described by Gibbons in the Journal of Conchology II, pp. 135, 136, plate I, *Stenogyra octonoides*, *Pupa fallax*, and *Drymaeus multilineatus* noticed on p. 136; also Man. Conch. XIII, p. 29. Perhaps *Cionella gloynii* belongs to Mr. Smith's group *Neosubulina*. Another species, "*Macroceramus inermis* Gundl.," is also reported. The dentition of some of these specimens has been examined by Binney, and proves to be like that of *M. gossei*, so that the Curaçao shell is a member of the genus *Microceramus*. It is no doubt distinct from the East Cuban *Mac. inermis*, and may be related to or identical with *Pineria bonairensis* Smith. The latter is probably a *Microceramus*, but I have not seen specimens. Mr. Gibbons' note adds six species to the fauna of Curaçao, raising the total number now known to twelve.—H. A. PILSBRY.



FRIERSON : UNIO DECLIVIS AND U. TETRALASMUS.

THE NAUTILUS.

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No. 5.

THE SPECIFIC VALUE OF UNIO DECLIVIS, SAY.

BY L. S. FRIERSON.

The synonymy of *Unio tetralasmus* Say, given by R. E. Call in the Transactions St. Louis Academy of Sciences, vol. vii, 1895, page 52, has been very generally followed; wholly by some, and partially by others. Mr. Call says: "It preserves its specific character so generally that it is a matter of great surprise that so many synonyms should fall under it. The study of the figures, descriptions and localities above indicated will furnish convincing evidence of identity. Of the total number [of synonyms] listed seven came from Louisiana and contiguous territory; of these seven, five are from the same state (*Louisiana*) and of those five two are from the same bayou." I have faithfully studied the descriptions, etc., above indicated, together with the shells themselves in their native habitat, Louisiana, with the result that I find *U. declivis* Say, to be readily recognizable as a perfectly distinct species from the balance of this group, with *U. geometricus* Lea, as a synonym (according to Dr. Lea himself). *Unio declivis* is, moreover, very *rare* as compared with the rest of the group, and generally misunderstood. In order that students may recognize the shell it is figured herewith, and the following specific differences noted:

First. It never attains the extreme size of *U. tetralasmus* as shown by the following measurements, based on adult specimens of each:

U. declivis, length 85, height 45, diameter 35 mm.

U. tetralasmus, length 133, height 70, diameter 50 mm.

Second. The beaks of *U. declivis* are more nearly *terminal* than in *U. tetralasmus* (both Say and Lea mention this fact in describing the species).

Third. The color of the nacre of *U. declivis* is "purplish" (*vide* Say and Lea), while that of *U. tetralasmus* is always white, very frequently dull, with large blotches of olive-brown. This is an invariable characteristic of the thousands I have collected.

Fourth. *U. tetralasmus* Say, is rounded or bluntly pointed posteriorly, with a rounded or obsolete posterior ridge; while *U. declivis* when *perfect* is much more acutely *rostrate* posteriorly, as noted by Mr. Say, with a "subcarinated" posterior ridge.

Finally, these species inhabit different stations, *U. declivis* being found in *rivers* (Say's type and Lea's *U. geometricus* both came from Bayou Teche, a navigable stream) while *U. tetralasmus* invariably lives in the "small streams and ponds of the South," as stated by Conrad. An apparent exception being Lea's *U. symmetricus* which he said came from (Alexandria, La.) the Red River; but he procured his shell at second hand from Dr. Hale, who no doubt was in error, as he assuredly was in the case of other shells said to have come from the same river. These shells can live in localities where, from three to six months at a time, there is *absolutely no water*; in fact living shells have been thrown out by the plowshare, and hundreds have been seen killed by fire sweeping over the dried-up ponds. (See plate III, middle figure.) *This ability to withstand droughts is no doubt a cause for the misunderstanding of the group.*

Mr. Simpson, in his "Synopsis of the Naiades," says: "and if there were no connecting links, it would be easy to make half a dozen species out of it." If the species happens to grow in constant waters, they form more or less perfect shells, and are easily seen to be distinct species. But on account of their drought-resisting abilities and the preference for *small* streams in the case of the *tetralasmus* crowd, it may easily be seen that a *majority* of the adult shells have had to resist droughts and live through a succession of dormant stages. During these dormant periods, the mantle of the animal is partially withdrawn and the deposition of the epidermis and columnar layers ceases, but the inner nacre is still deposited. The mantle is especially withdrawn from the *end* of the prominent *rostrated* portion of

U. declivis. In consequence there are produced in this way many variations and malformed specimens.

A colony of *rough*, black and corroded *U. tetralasmus* was taken from a stream across which a boy could jump, and planted in a railroad tank of fifteen acres, newly made by the K. C. S. R. R. Two years after, one of their progeny was taken from this tank, with a yellow, smooth epidermis as hard and glossy as glass, and as distinct from *U. declivis* as *luteolus* is from *ligamentinus* (see pl. iii, upper figure).

In this connection, the writer would remark that in an article published several years ago (NAUTILUS XI, 3), under the caption "Conchological Notes from Louisiana," he spoke of the above-mentioned difference in habitat of *U. declivis* and *U. tetralasmus*. But at that time all of his specimens were named according to prevalent tradition, and he exactly *reversed* their names.

Like many other young collectors, the writer has in this way sent out numbers of shells with erroneous names, and helped to make confusion worse confounded. He hopes herein to correct at least one of these errors, and at the same time to render justice to that most excellent naturalist, Thomas Say.

By comparing the figure with that given by Conrad in his Monography, page 45 (and on which Mr. Call's synonymy is based, no doubt,) it will be seen that the shells of *U. declivis* and *U. tetralasmus* are utterly unlike.

EXPLANATION OF PLATE III.

Upper figure. *U. tetralasmus* Say. R. R. tank, De Soto, La.

Middle figure. *U. declivis geometricus* Lea. Dried bed of Lake Connisnia, La., showing stunting and periodicity of growth induced by successive droughts.

Lower figure. *U. declivis* Say. Bayou Plaquemine, La., at Church Point.

A NEW SPECIES OF METZGERIA.

BY WILLIAM HEALEY DALL.

The genus *Metzgeria* Norman, has hitherto been known from a single species, the *pusilla* of Sars or *alba* of Jeffreys. This is reported from the coast of Norway and the northeastern North At-

lantic in relatively deep water. A second species from the Santa Barbara Channel, California, has lately reached me.

Metzgeria californica n. sp.

Shell small, translucent white, with a pale straw-colored, dull, wrinkled and rather conspicuous periostracum; nucleus small, smooth, white, obliquely inclined, of nearly two whorls; there are four or five rounded subsequent whorls separated by a deep, not channelled, suture; sculpture of about nine rather prominent, rounded axial ribs extending from suture to suture and on the last whorl to the base, separated by wider interspaces and crossed by numerous subequal spiral threads, covering the whole shell, their wider interspaces striated by the incremental lines. Aperture about half as long as the shell, the outer lip sharp, the throat smooth and white; the pillar white, not callous, with three distinct, oblique plaits beside the slightly raised margin of the canal, these are only visible from the side of the aperture; anteriorly the pillar is tortuous, slightly recurved, open and rather wide. Length of shell 14, of aperture 7; width of shell 6 mm.

This species is easily discriminated from *M. pusilla* by its deeper sutures and more convex whorls, and by having a more tortuous pillar with three or four distinct oblique plaits instead of only two. On a direct view, at right angles to the plane of the aperture, the plaits are invisible, but are perfectly distinct from a point more laterally situated. The operculum is elongate-quadrate with apical nucleus. The shell, with other specimens from the same locality, was sent to the National Museum by J. H. Paine.

NOTICES OF NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota (Euhadra) quæsita var. *decorata* n. v.

Smaller than *quæsita*, and much more coarsely sculptured with irregularly spaced, fold-like striae, which are well raised and in part light yellow; the ground-color of the shell being either that of *quæsita* or of the form *perryi*, the types being of the dark pattern.

Alt. 22, diam. 35 mm. (Ōkuki).

Alt. 18.5, diam. 28 mm. (Chojamura).

Ōkuki and Chojamura, Mutsu. Types no. 84884 A. N. S. P., from no. 985a of Mr. Hirase's coll.

Eulota (Euhadra) connivens var. *diversa* n. v.

Shell resembling the smaller *E. connivens* var. *phæogramma* Auc., but larger, with the periphery strongly angular, like a thick *Plectotropis*. Alt. 18, diam. 25.3 mm.

Riukiu I. Type 84877 A. N. S. P. Collector unknown.

Eulota (Euhadra) submandarina var. *miyakejimana* n. v.

Shell similar to *E. submandarina*, but the whorls of the spire are flatter, less convex.

Alt. 18.6, diam. 25 mm.

Alt. 16.5, diam. 21.7 mm.

Miyakejima, Izu. Types no. 84879 A. N. S. P., from no. 1067 of Mr. Hirase's collection.

Eulota (Euhadra) submandarina var. *niijimana* n. v.

Decidedly smaller than *E. submandarina*; subangular at the periphery, with $4\frac{3}{4}$ to 5 whorls.

Alt. 12.3, diam. 17.5 mm.

Alt. 12, diam. 17 mm.

Niijima, Izu. Types no. 84880 A. N. S. P., from no. 1051 of Mr. Hirase's collection.

Ennea iwakawa var. *oshimana* n. var.

Differs from *E. iwakawa* in being much larger; from var. *yakashima* in the decidedly more slender form. Alt. 4.3, diam. 1.7 mm.

Oshima, Osumi. Types no. 84875 A. N. S. P., from no. 936 of Mr. Hirase's collection.

Like almost all of the species of Oshima, this is quite noticeably differentiated from the allied form of the main islands of Japan.

Tornatellina kitaiwojimana n. sp.

Shell perforate, globular, with short, very obtuse, conic spire; thin and fragile, transparent horn-colored, faintly and finely striate. Whorls $3\frac{1}{2}$, convex. Aperture large; columella bearing a prominent, squarish double fold; parietal wall bearing a small, rather short entering lamella. Length 2.7, diam. 2 mm.

Kita-Iwojima, Izu. Types no. 84965, A. N. S. P., from no. 1094 of Mr. Hirase's collection.

An extraordinary species, very unlike any other yet known from the region. Kita-Iwojima is one of the Sulphur or Volcano Islands, a little group lying southwest of the Ogasawara group, and on a line with the Izushichito group, or "Seven islands of Izu." They were discovered by Bernard de Torres in 1543, and are governed by Japan from the Ogasawara Is. Volcanic forces are still active in this group, which is regarded by Yoshiwara as a continuation of the Fuji chain, rather than orogenically belonging to the Ogasawaran volcanic chain.

The following species of land shells have been found on Kita-Iwojima :

Tornatellina inexpectata Pils.

Tornatellina kita-iwojimana Pils.

Tornatellina hataiana Pils.

Opeas gracile ogasawaranum Pils.

Kaliella præalta var. *izushichitoensis* n. v.

Shell smaller than *K. præalta*, with decidedly stronger peripheral angle. Brown, somewhat transparent.

Miyakejima, Izu. Types no. 84961, A. N. S. P., from no. 1060a of Mr. Hirase's collection. Also, Niijima, Izu, no. 1060 of Mr. Hirase's collection.

Kaliella nesiotica n. sp.

Shell conic, with very slightly convex lateral outlines, obtuse summit, acutely thread-carinate periphery and slightly convex base; transparent brown. Whorls fully 6, slightly convex, parted by a suture in which the fine thread-like keel ascends. Sculpture of extremely minute, rather widely-spaced hair-striæ. Aperture basal, squarish, the columellar margin reflexed above. Alt. 3.6, diam. 3.2 mm.

Miyakejima, Izu. Types no. 84964, A. N. S. P., from no. 1072 of Mr. Hirase's collection.

Near *K. crenulata* Gude, but the excessively fine hair-like striæ are much more widely spaced in this species.

Sitala niijimana n. sp.

Shell minutely perforate, with conic spire, obtuse apex, strongly

angular periphery and convex base; thin, fragile, and of a pale, somewhat transparent horn-color. Surface faintly marked with growth-wrinkles, and under very strong magnification, showing an excessively minute, close decussation of radial and spiral lines. General outlines of the spire straight. Whorls $3\frac{1}{2}$, convex. Columella reflexed above. Alt. 2, diam. 2.3 mm.

Niijima, Izu. Types no. 84963, A. N. S. P., from no. 1057 of Mr. Hirase's collection.

The rather acutely angular periphery is nearly in the middle of the height of the shell. It is referred to the genus *Sitala* on account of its spiral sculpture, which is, however, excessively minute.

NOTE ON THE FAMILY SEPTIDÆ.

BY W. H. DALL.

In the Report on the Mollusks of Porto Rico, I adopted for the family *Tritonidæ* of authors, the name *Septidæ*, and for the typical genus the name *Septa*, proposed by Perry in 1811. Perry's list of species comprised six, beside which he mentions the *Murex tritonis* of Linné (spelling the specific name *tritonis*, but his meaning is obvious). His genus was equivalent to the genus *Triton*, as used by authors of the first half of the 19th century. His largest and most conspicuous species, which he compares with *Murex tritonis*, belongs to the same group as the latter, which was generally accepted as the type of the old genus *Triton* and reserved for it by Montfort when he divided the genus, a year earlier than Perry. Therefore I accepted *Septa rubicunda* Perry (= *Triton nodiferus* Lam.) as the type of Perry's genus and applied the name to the congeneric species of Porto Rico, since *Triton* is preoccupied.

In an interesting and useful paper by H. Leighton Kesteven, referred to in the June number of the NAUTILUS, the author does not accept the name *Septa* because Perry's first species is a *Lotorium* and without argument is taken by Mr. Kesteven as type. He shows very clearly that the name cannot be used for *Lotorium*, but does not observe that I never proposed to so use it. I used it for the group of *Murex tritonis* L., which is generically distinct from the group of which *Lotorium* is a member, and which, as Mr. Kesteven shows,

has no other name at present which is valid. I was not obliged to take the first species of *Septa* as a type, knowing it to be a *Lotorium*, and did not. The species for which I used it had no valid generic name and *Septa* was applicable, and should, I think, be adopted.

ON SOME NEW LAND MOLLUSCA FROM MIDDLE AMERICA.

BY C. F. ANCEY.

I. *Streptostyla Sumichrasti*, n. sp.

S. Sumichrasti, Crosse & Fischer, in coll. Sallé.

Testa cylindraceo-oblonga, tenuis, nitidissima, obsolete et flexuosa substriatula, læte fulvo cornea, concolor sed ad apicem obtusulum pallidior. Spira gradata, conoideo-attenuata. Anfractus $6\frac{1}{2}$ convexiusculi, sutura canaliculata divisi, ultimus elongatus, latere dextro leviter planulatus. Apertura subauriformis, superne longe attenuata, basi subdilatata; lamina columellaris tenuis, vix callosa, elongata, spiraliter torta, basi antice vix truncata. Peristoma obtusiusculum, flexuosum, medio antice dilatatum, basi recedens.

Long. 29, diam. 13, alt. $19\frac{1}{2}$ mill.

Hab. in isthmo Tehuantepec, reipublicæ Mexicana (coll. Ancey, Dautzenberg, Jousseume).

A fine large species related to the smaller *S. lurida*, Shutt. and *S. Bocourti*, Cr. & Fisch., but much more slender than the latter and of a more graceful oblong shape than the former. This is surely distinct from any species I examined in the collection of the late A. Sallé, now in the possession of Mr. Ph. Dautzenberg.

II. *Streptostyla clavulata*, n. sp.

Testa parvula, primo aspectu Ferussacii ex grege *F. procerulæ* similis, tenuis, nitida, obsolete vix striatula, verisimiliter statu recenti pallide cornea, sed emortua albido-hyalina, cylindraceo-elongata, oblongula. Spira producta, regulariter attenuata, obtusa, apice magno. Anfractus $6\frac{1}{4}$, subplanulati, sutura appressa, parum distincta, infra pellucido marginata divisi; ultimus cylindraceo-oblongus, basi subattenuatus. Apertura superne angusta, basi dilatata, lamina columellaris brevis, parum valida, subcallosa, leviter

spiraliter torta, basi antice truncatula. Peristoma obtusum, medio antice flexuoso-productum, basi recedens.

Long. $8\frac{2}{3}$, lat. 3, alt. apert. 4 mill.

Hab. in America centrali (?).

A small elongate shell, quite unlike any other I am acquainted with and resembling a *Ferussacia*. I am indebted for a specimen to Mr. Ph. Dautzenberg, who procured two examples in a lot of loose miscellaneous shells from various localities.

A PARTIAL LIST OF THE MARINE MOLLUSKS OF SAN SALVADOR, BAHAMAS.

BY FRANK COLLINS BAKER.

The following partial list of San Salvador shells is based on a collection exhibited at the World's Columbian Exposition, and now in the Field Columbian Museum, by whom it was referred to the writer for identification.

San Salvador, or Watling Island, is one of the Bahama Islands, and lies just north of the Tropic of Cancer. Its molluscan fauna is like that of the West Indies and Florida. The specimens are mostly beach shells.

<i>Arca barbata</i> Linne.	<i>Cerithium literatum</i> Born.
<i>Lucina dentata</i> Wood.	<i>Trivia pediculus</i> Linne.
<i>Lucina pennsylvanica</i> Linne.	<i>Trivia quadripunctata</i> Gray.
<i>Submarginula octoradiata</i> Gmelin.	<i>Lambidium oniscus</i> Linne.
<i>Acmæa punctulata</i> Gmelin.	<i>Tritonium chlorostomum</i> Lamarck.
<i>Fissurella barbadensis</i> Gmelin.	<i>Pyramidalla dolabrata</i> Linne.
<i>Fissurella fascicularis</i> Lamarck.	<i>Columbella ovulata</i> Lamarck.
<i>Nerita tessellata</i> Gmelin.	<i>Columbella mercatoria</i> Lamarck.
<i>Nerita versicolor</i> Lamarck.	<i>Olivella nivea</i> Gmelin.
<i>Nerita peloronta</i> Linne.	<i>Conus mus</i> Hwass.
<i>Neritina pupa</i> Linne.	<i>Conus verrucosus</i> Hwass.
<i>Hipponyx antiquatus</i> Linne.	<i>Bulla occidentalis</i> A. Adams.
<i>Polinices lactea</i> Guilding	<i>Melampus flavus</i> Gmelin.
<i>Natica canrena</i> Lamarck.	<i>Cerion</i> sp.
<i>Tectarius muricatus</i> Linne.	

NOTES, NEWS AND REVIEWS.

THE USE OF THE GENERIC NAME *HELICOSTYLA*.—In the discussion of the nomenclature of "*Cochlostyla*," it has not been noticed that Mörch, in 1865, used the name *Helicostyla* to include *Axina*, *Corasia*, *Helicobulimus*, etc. He gives a new name *Pythohelix* for the species *bohokensis* and *fulgetrum* and misspells *Orustia* ("Onistia") and *Corasia* ("Coracia"). See Journ. de Conchyl., 1865, p. 385.—H. A. P.

THE ZOÖLOGICAL RECORD, Vol. xxxix, 1902. Mollusca. By E. R. Sykes, B. A., assisted by E. A. Smith, I. S. O., pp. 85. The total number of titles recorded is 611; this of course including many papers purely palæontological. As in the preceding records compiled by Mr. Sykes, the summaries relating to Anatomy and Distribution are especially full, and cannot fail to be of the utmost utility to many students. Thus, on p. 45, references to all articles dealing with inland mollusks of the United States may be found. It may be well to call attention here to a slip, whereby the species of *New Mexico* are placed under "Neotropical, Mexican Region," p. 44, and omitted from "American Region." While New Mexico has a "Lower Austral" element in *Holospira*, this genus has occurred only in a few places in the extreme south, and the fauna as a whole is overwhelmingly "nearctic." Again, Washington, Oregon and Bahamas are put in the "Transatlantic Province" (p. 50), whereas the two former should have been placed in the "Californian," and the latter in the "Caribbean." The systematic part seems to be very well done; though in treating the Pelecypoda, a further classification would certainly facilitate reference. The several parts of the Record may now be purchased separately, the Mollusca for 4, the Brachiopoda 1 shilling.¹ They will be found well worth the price, even to the local naturalist, for the information on what is being done the world over in the study of mollusks.

NOTES ON POLYPLACOPHORA OF THE CONCHYLIEN CABINET.—The monograph on this group, by S. Clessin, has now progressed

¹From the Zoölogical Society, 3 Hanover Square, London.

far enough to show the general quality of the work. The figures are all bad copies, as well as most of the descriptions; and such classification as there is is only right by accident; such cases being readily accountable for by the law of chances. If it were only a reasonably careful compilation, the work might still have a certain value; but it abounds with minor blunders, such as "*Chiton sowerbyanus*" for *C. sowerbyanus*, "Port Jankson," "*Chiton goodalii*," etc.; but perhaps the most amusing case in the part just issued is that of *Chiton sulcatus* Wood. This is renamed *Chiton Woodii* Cles., and said to be from "Lord Woods Insel der Gallopagos." The new name is of course quite unnecessary, because *Ch. sulcatus* Wood dates from 1814, some years prior to any other use of that specific name. The new name *Chiton* (*Callochiton*) *Carpenteri* Cles. (p. 64), is a synonym of *Callistochiton pulchellus* Gray, besides being pre-occupied, see p. 25 of the same work. When the monograph on Scaphopoda in the *Conchylien Cabinet* was issued, I thought that for blunders and general inadequacy it could not be surpassed; but the work on Chitons, by the same author, promises to be a close second.—H. A. P.

Zweiter Beitrag zur Binnen-conchylien des Miocäns von Oppeln in Schlesien.—Von Prof. Dr. A. Andreae. Hildesheim, Dec., 1902. In this further study of a Miocene land-shell fauna, Prof. Andreae brings out several novelties of unusual interest. The new group *Gyrulina* contains *Hyalinia* (*G.*) *roemeri* n. sp., a form very similar to our *Helicodiscus lineatus*. There is a new species of *Strobilops*, described under the name *Strobilus*. Also several interesting Helices. *Adelopoma martensi* n. sp., is a minute Diplommatina-like form, in which relation is found with South American species described under the genus *Adelopoma* of Doering, ranging from Argentina to Guatemala. In this connection it may be well to call attention to the fact that forms of the same genus occur in eastern Asia. "*Diplommatina*" *pusilla* Mart. of Japan, and its variety *omiensis* Pils., which are placed by Kobelt (Tierreich, *Cyclophoriden*) in *Cylindropalaina*, really have all the shell characters of *Adelopoma*. Also *D. amurensis* Mouss. (Journ. de Conchyl., 1887), from Vladivostock, which is apparently identical specifically with *pusilla* Mart. Another German Miocene species, *Diplommatina dietzi* Flach, is referred by Dr. Andreae to *Adelopoma*. The distribution of the genus

is somewhat similar to that of *Clausilia* and the Belogonous Helices—European, Oriental and South American.—*H. A. Pilsbry*.

A BIOLOGICAL RECONNOISSANCE IN THE VICINITY OF FLAT-HEAD LAKE [MONTANA].—By Morton J. Elrod. (Bulletin Univ. of Montana, No. 10.) A synopsis of work in all branches of Zoölogy done at the Biological Station of the University of Montana. Besides a good many notes on mollusks throughout the text, there is a catalogue of Montana shells (pp. 170–174), and illustrations of a series of varieties of *Pyramidula strigosa* (plate xxvii) and *P. Elrodi* (pl. xxxii).

CLASSIFICATION OF THE BRITISH SPECIES OF THE GENUS SOLEN L., etc. By H. H. Bloomer (Journal of Malacology, x, 1903). Mr. Bloomer, continuing the series of articles upon the anatomy of *Solen*, gives us a description and illustrations of *Ceratisolen legumen*, *Solecurtus strigillatus* and *S. candidus*. The former has much in common with *S. ensis*, while as would be expected, *Solecurtus* differs in many respects. Respecting the true Solens, Mr. Bloomer looks upon "*Solen vagina* as a more primitive form, and *Ensis ensis* and *E. siligua* as more specialized forms." *Cutellus pellucidus* coming somewhere between. He finds anatomical differences between *Solen* and *Ensis*, sufficient to call for the generic separation of the latter group, which until very recently has been considered a subgenus of *Solen*. These careful, comparative studies in Pelecypod anatomy are valuable and worthy of imitation.

MRS. MARY P. OLNEY.

We have recently learned with great regret, of the death of Mrs. Mary P. Olney, of Spokane, Wash. Mrs. Olney was a devoted lover of nature, and notwithstanding her advanced years, has taken a very active interest in the study of mollusca. Interesting notes such as: "Odor of snails," "Young *Pyramidula strigosa*," etc., were frequently contributed to THE NAUTILUS, and one form, *Polygyra mullani* var. *OLNEYÆ*, was dedicated to her.

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No. 6.

A NEW GENUS OF TROCHIDÆ.

BY WILLIAM HEALEY DALL.

In dredging between Oahu and Molokai in the Hawaiian Islands, in depths varying between 220 and 436 fathoms, sandy and rocky bottom, the U. S. Fish Commission steamer "Albatross" obtained a number of specimens of a large deep-water gastropod shell, occupied by hermit crabs and completely covered by the extended basal membrane of a large *Actinia*. It is not uncommon to find gastropod shells covered by sponges or hydroid zoophytes, commensal with a Paguroid crab, and it often happens that the zoophyte grows beyond the margin of the aperture forming a shield for the growing crab, to their mutual advantage; since the crab in such cases does not have to seek a new habitation on the ground that the old one has become too small for him, while his movements prevent the zoophyte from becoming smothered by the mud, as might happen if the crab sought another domicile and left the old one lying on the bottom. In such cases the lime of the original shell is often gradually absorbed, though the sponge or zoophyte retains more or less of the original form. In the present case, however, the original shell appears to be normally so deficient in lime as to be practically of a flexible, horny consistency and chiefly composed of a rather tough, thick layer of conchioline. In order that it may retain its shape, it is necessary to keep it in alcohol, as in the case of *Torellia* and some forms of *Velutinidæ*.

STYLOBATES n. g.

Shell depressed-turbinate, few whorled, feebly calcified, with a deep, funicular umbilicus bordered by a carina; surface wrinkled in harmony with the incremental lines; aperture ample, interrupted by the body whorl, the pillar lip straight, the outer lip and base continuously arcuate; the suture appressed. Animal? operculum?

Stylobates æneus n. sp.

Shell large, flexible, with three rapidly-enlarging whorls, which are moderately convex above, descending to a well-marked but not deep appressed suture; base convex, the margin of the umbilicus carinate, its cavity straight-sided and funicular; last whorl expanded at the aperture, which has a thin, simple margin, straight at the termination of the umbilical coil, slightly angular at the intersection of the umbilical carina, the lips above separated for a short distance on the body whorl; shell of yellowish-gray color (in alcohol) with a well-marked, brassy lustre; sculpture of small, irregular wrinkles harmonizing with the lines of growth; outer lip somewhat sinuous and gently excavated at the periphery; upper margin of the aperture advancing beyond the lower. Maximum diameter about 75, minimum 40, height 35, diameter of umbilicus about 10 mm.

Habit, station 3893 of the U. S. Fish Commission steamer "Albatross," in the Hawaiian Islands. There are occasional minute granulations on the surface which may, however, be merely individual peculiarities. The soft parts and operculum are as yet unknown.

This large and peculiar shell does not closely resemble any other deep-water form yet recorded. While its proper classification must remain unsettled until the soft parts are obtained, its general form and habit recall several of the *Trochidæ*, and bear a curious superficial resemblance to the New Zealand land shell formerly known as *Lélix* (now *Paryphanta*) *busbyi*.

DISTRIBUTION OF JAMAICAN SPECIES OF COLOBOSTYLUS.

BY P. W. JARVIS.

In this group there are thirteen clearly marked species:

Colobostylus interruptus (Lam.).	C. nuttii Pils.
C. humphreyanus (Pfr.).	C. albus (Sowerby).

<i>C. thysanoraphe</i> (Sowerby).	<i>C. banksianus</i> (Sowerby).
<i>C. jayanus</i> (Ads.).	<i>C. yallahensis</i> (Ads.).
<i>C. redfieldianus</i> (Ads.).	<i>C. tectilabris</i> (Ads.).
<i>C. bronni</i> (Ads.).	<i>C. lamellosus</i> (Ads.).
<i>C. chevalieri</i> (Ads.).	

Colobostylus interruptus (Lam.) (Area No. 12). Living specimens of this species are very rare, and only occasionally found on the Dallas mountains, but weather-beaten shells are very abundant on Long and Dallas mountains, lying to the north of Kingston. In Mr. Henry Vendrye's list of Jamaican Land and Fresh-Water Shells, it is classed under *Choanopoma*.

Colobostylus humphreyanus (Pfr.) (Area No. 4) inhabits a very wide area, from the Cockpit country in St. Elizabeth and Trelawny, westward to "Silver Spring," in Westmoreland. The differences between specimens from distant localities are very slight and there seems to be no tendency to vary amongst individuals.

Colobostylus thysanoraphe (Sow.) (Area No. 6) occurs on the high mountains in the center of the island. Fairly abundant in the Cave Valley district.

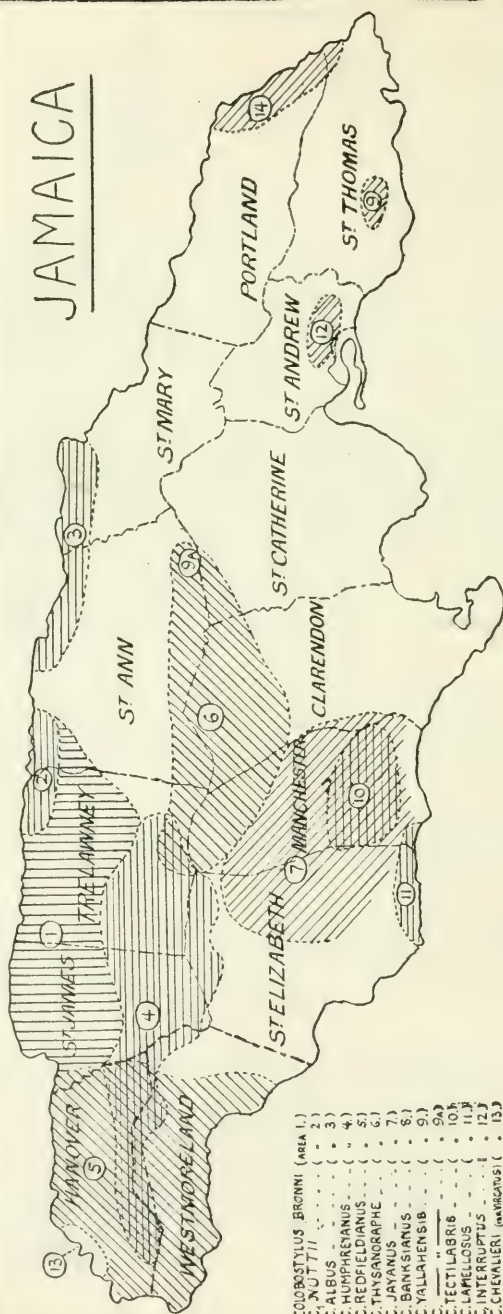
Colobostylus jayanus (Ads.) (Area No. 7) is common throughout Manchester. This species is somewhat nearly allied to *C. thysanoraphe*. I have not yet found either any intermediate varieties or both species in one locality.

Colobostylus redfieldianus (Ads.) (Area No. 5) occurs in the two parishes of Westmoreland and Hanover. Varies considerably in size and color.

Colobostylus bronni (Ads.) (Area No. 1). The metropolis of this shell is the highland parts of St. James and Trelawny where it abounds, it is common in smaller numbers throughout these two parishes.

Colobostylus chevalieri (Ads.). The typical form of this very pretty shell occurs somewhere in the mountains near Montego Bay. I have not yet found it. Dr. F. A. Sinclair, who has kindly given me specimens, did not take note at the time of the exact locality. The varieties *album* and *virgatum* of Adams, are found together at Green Island in Hanover (Area No. 13).

JAMAICA



- COLOBOSTYLUS BRONNI (AREA 1.)
 C. NUTTALL - (2)
 C. ALBUS - (3)
 C. HUMPHREIANUS - (4)
 C. REDFIELDIANUS - (5)
 C. THYSANDRAPHE - (6)
 C. JAYANUS - (7)
 C. BANKSIANUS - (8)
 C. YALLAHENSIS - (9)
 C. TECTILABRIS - (10)
 C. LAMELLOSUM - (11)
 C. INTERRUPTUS - (12)
 C. CHEVALIERI (var. fuscus) - (13)
 C. ALBUS (var. fuscus) - (14)

DISTRIBUTION OF THE SPECIES OF COLOBOSTYLUS.

Colobostylus nuttii Pils. (Area No. 2), is found on the Coast mountains at Braco, near Duncans.

Colobostylus albus (Sowerby) (Area No. 3). The typical forms of this species inhabit the coast mountains from Port Maria to St. Anns Bay and for a few miles inland. The var. *fuscus* of Adams, comes from the John Crow hills in Portland (Area 14).

Colobostylus banksianus (Sowerby) (Area No. 7). This species has its headquarters in Manchester and spreads for a considerable distance across the borders of St. Elizabeth and through the Cockpit country.

Colobostylus yallahensis (Ads.) (Area No. 9). The types of this species came from "Roaches Gully," on Creighton Hall Estate, in St. Thomas; it is also found at one or two other places on the Yallahs hills. This species also crops up at Schwallenburg (Area 9 A) on the slopes of Mount Diablo, in St. Anns. I do not know of its having been found anywhere else than in these two small areas.

Colobostylus tectilabris (Ads.) (Area 10), inhabits the central and southern parts of Manchester. It is widely distributed over this area but not common.

Colobostylus lamellosus (Ads.) (Area No. 11) is found on the mountains of the South Coast of St. Elizabeth.

A NEW JAMAICAN COLOBOSTYLUS.

BY HENRY A. PILSBRY.

Colobostylus nuttii n. sp.

Shell narrowly umbilicate, turbinate conic, similar in general shape to *C. chevalieri* (C. B. Ad.); surface very finely, densely and regularly striate throughout, the striae more spaced and sharper on the early whorls, exactly as in *C. albus*. Coloration various, but usually consisting of a wide, purplish or purple-brown belt, leaving a pale or whitish band below the suture and around the umbilicus; the penult. whorl or whorl and a half bicolored, the lower part dark, the upper whitish; the upper whorl always purple-black. 3 to $3\frac{1}{2}$ very convex whorls remain, the summit being truncate. The aperture is vertical, chest-

nut-brown within, at least in large part, not quite circular, being a little longer than wide, and with the inner margin less arcuate than the outer. Peristome moderately broad, with a low, brown, raised inner rim, and whitish or white expansion, which is dilated into a slightly recurved or concave lobe above, adnate to the preceding whorl; it is also a little dilated at the columellar margin. The umbilicus is smooth within, but rarely shows faint traces of a few spiral cords.

Length 17, diam. 13 mm.

Length 15, diam. 11 mm.

The operculum is white externally, slightly concave, rather coarsely wrinkled tangentially, and with about $2\frac{1}{2}$ whorls after the blackish nucleus, which is situated at about the lower third, and much nearer the columellar than the outer margin. The edge is very deeply grooved, the sides of the groove smooth or nearly so.

Braco, Trelawny, in northwestern Jamaica, the types collected by Mr. George Nutt, and sent by Mr. P. W. Jarvis.

This species differs from *C. chevalieri* in the sculpture of fine vertical striae, the obsolescence of spiral cords around the umbilicus and in coloration. *C. albus*, which has similar sculpture and operculum, differs in the narrow lip, not dilated above. The latter species is the most nearly related form known to me.

Sometimes the wide median color zone is split by a lighter peripheral tract; or it may be reduced to a narrower belt below the periphery.

NOTES ON THE MOLLUSK FAUNA OF SAN NICHOLAS ISLAND.

BY HERBERT N. LOWE.

San Nicholas, the most bleak and barren bit of land in the whole group of the Santa Barbara Islands, lies apart from its more favored sister islands, sixty-five miles from the mainland. It is a small island, barely nine miles long, by four or five wide, without a vestige of a tree of any kind, and very little of the cactus, which grows in such quantities on the other islands. About half its area is a great desert of shifting sands where lie the bleaching bones of an extinct race of Indians which inhabited the island many years ago. Many

strange and interesting implements of stone, bone and shell have been found, showing very skillfull workmanship.

On this favored spot it was the writer's good fortune to spend three weeks in scientific research during the month of February, 1902. The marine shells are all of rare occurrence, with the exception of *Acmæa gigantea*, *Haliotis cracherodii* and *Mytilus californianus*, which grow on the rocks by the thousand. The red "abalone," *Haliotis rufescens*, used to be very abundant on the island, as was also the giant *Cryptochiton stelleri*, but are now of very rare occurrence. The smaller species, such as *Ocenebra circumtexta*, *Marginella varia*, *Gadinia reticulata*, *Mitromorpha filosa*, *Megatebennus bimaculatus* and a few of the smaller *chitons* were found under stones in little sheltered inlets away from the heavy surf.

The remainder of the coast line is composed alternately of great ledges of smooth rocks and strips of smoother sand beach. Unlike the other islands, with their steep cliffs jutting off abruptly into deep water, San Nicholas is low, lying with bluffs sloping gradually to the water's edge, with shallow water a long distance from shore. A belt of kelp, in places more than a mile wide, surrounds the island, making a landing very difficult. A fair idea of the marine species inhabiting the coast may be obtained from the bleached shells found on the old Indian camp grounds, as they seemed to have eaten molluscs of every description, principally the *Haliotis*, fragments of which cover the mounds by the million, and the iridescent shells reflecting the rays of the sun in a gorgeous and dazzling play of color, present a picture long to be remembered.

The following is a list of marine species found on the Indian mounds:

Cypræa spadicea Gray.

Trivia solandri Gray.

Irato vitelina Hds.

Acmæa gigantea Gray.

Acmæa mitra Esch.

Acmæa pelta var. *nacelloides* Dall.

Chlorostoma brunneum Phil.

Chlorostoma montereyensis Kien.

Chlorostoma funebre A. Ad.

Gadinia reticulata Cpr.

Cryptochiton stelleri Midd.

Cardium quadrigenarium Con.

Cardium biangulatum Sby.

Rupellaria lamellifera Con.

Lucina californica Con.

Venus fordii Yates.

Hinnites giganteus Gray.

Pecten æquisulatus Cpr.

Tapes staminea Con.

Norrissia norrissii Sby.

<i>Lucapina crenulata</i> Sby.	<i>Monoceros lapilloides</i> Com.
<i>Fissuridea aspera</i> Esch.	<i>Olivella boetica</i> Cpr.
<i>Pachypoma inaequale</i> Martyn.	<i>Oliva biplicata</i> Sby.
<i>Pomaulax undosus</i> Wood.	<i>Purpura saxicola</i> Val.
<i>Ocenebra circumtexta</i> Stearns.	<i>Mytilus californianus</i> Con.
<i>Fusus barbarentis</i> Trask.	<i>Haliotis rufescens</i> Swain.
<i>Mitra maura</i> Swains.	<i>Haliotis cracherodii</i> Leach.
<i>Cancellaria cooperi</i> Gabb.	<i>Haliotis corrugata</i> Gray.
<i>Ischnochiton conspicuus</i> Cpr.	<i>Natica</i> sp.

The reefs where the *Acmæa gigantea* have their home, jutting out between the sand beaches, are, after every storm, temporarily covered over with sand. At such times a large quantity of sand gets under the mantle of the *Acmæa*, causing little nodules to be formed on the inside of the shell, from the size of a pinhead to that of a small bean. The shells were of unusual thickness, to withstand the continual pounding of the surf.

As I have previously stated, the island is almost destitute of vegetation, making the land shells few and far between. The only species were: *Helix tryoni*, found alive in small numbers; *H. feralis*, one fresh specimen and occasional dead ones; *H. sodalis*, none but dead and bleached ones. I should probably not have obtained any live *Helices* had it not been for a rain storm which came on while I was on the island, when the tiny creatures seemed to sprout as it were from the bowels of the earth. After every rain storm there comes a fierce, drying, west wind, which makes the snails "hunt their holes" in a hurry, and any unfortunate *Helix* not under cover is made short work of by the scorching winds and sand blowing upon them. About the only food for the snails is a low-growing salt bush, at the roots of which they burrow in the dry season. At the east end of the island are found the few scattering live *Helices* with comparatively few dead shells, while at the west end of the island the dead and bleached shells lie by the thousand on the great stretches of shifting white sand. As there is no vegetation whatever at that end of the island, and the prevailing winds, in the opposite direction, makes it impossible for them to have been driven there by that agency, it remains an unanswered question how came these myriads of dead and bleached shells in this sand desert?

At the west end occasional springs of fresh water drip from over-

hanging ledges of rock to little pools on the sand beach, and then flow to the great ocean without having benefited the island in any way. In these little pools a few small stunted *Physas* were found.

During the winter season the island is the rendezvous of Japanese fishermen, who catch lobsters for the Los Angeles market. They also make a business of hunting *abalones* at low tide. The meats are cleaned from the shells, boiled in salt water and spread on the flat rocks to dry, when they are sacked up and shipped to Japan and China, and considered a great delicacy by the celestial epicures. The shells are sent to Los Angeles and made into pearl buttons, souvenir spoons and various "curios" to tempt the pocket-book of the tourist.

NEW JAPANESE MARINE MOLLUSKS.

BY HENRY A. PILSBRY.

Phasianella tristis n. sp.

Shell imperforate, globose turbinate, thick and solid, dark reddish-brown, the apical whorl whitish; smooth. Spire short. Whorls 3, rapidly increasing, the last rounded. Aperture more than half the length of the shell, oblique, rounded-ovate; columellar margin regularly concave, flattened and callous. Alt. 3.6, diam. 3 mm.

Rishiri, Kitami. Types no. 85222 A. N. S. P., from no. 1367 of Mr. Hirase's collection.

Near *P. oligomphala*, but the aperture is less oblique, the shell more solid and of a more sombre color.

Gibbula affinis var. *cognata* n. v.

Differs from *G. affinis* of the Viti Is. in having the larger spiral cords more equal and regularly spaced, the apical whorls rose-colored. Riukiu I.

Gibbula vittata n. sp.

Shell narrowly but openly umbilicate, conic, fleshy-brown, striped longitudinally with white, the white stripes about half as wide as the darker ones. Surface nearly lusterless. Whorls subangular above

the middle of the upper surface, the last also angular at the periphery; sculptured with narrow spiral cords, of which there are four between the peripheral angle and the shoulder, the surface nearly smooth or with one cord above the shoulder. Base with about nine spiral cords. Whorls nearly 6. Aperture oblique, rounded, angular at the base of the columella, smooth within. Columella straightened in the middle. Umbilicus smooth and white within. Alt. 6, diam. 5.3 mm.

Riukiu I. Types no. 82037 A. N. S. P., from no. 1318 of Mr. Hirase's collection.

Gibbula incarnata n. sp.

Shell perforate or closed, turbinate, coral-red, uniform or with some paler or whitish spots at the periphery, a small area around the columella white. Sculptured with nearly smooth spiral cords as wide as their intervals, nine in number on the penultimate whorl. On the somewhat flattened base there are about 8 finer cords. Spire conic, the apex obtuse. Whorls 5, convex, the last subangular around the base. Aperture oblique, irregularly rounded, smooth within. Columella wide and calloused. Alt. 5.3, diam. 5.

Kumihama, Tango. Types 82141 A. N. S. P., from no. 1323 of Mr. Hirase's collection.

Monilea (Rossiteria) nucleolus n. sp.

Shell depressed globose-conic, narrowly umbilicate; white with an interrupted buff zone above, and conspicuously variegated with squarish black-brown spots, of which there is a row of broad ones below the suture (three or four on a whorl), a row of smaller ones just above the periphery, and another on the base. Besides these, there is an irregular articulation or dotting of dark brown on the spiral cords. Surface glossy, sculptured with numerous very low and subequal, nearly smooth, spiral threads, almost obsolete on the base, but reappearing at the border of the umbilicus; and showing under a lens, subregular, close, longitudinal grooves, almost obsolete, but visible near the suture and umbilicus. Whorls 5, convex, the last well rounded. Aperture oblique, the columellar margin deeply concave in the middle; columella abruptly truncate at the base. Outer lip bevelled to a sharp edge, thickened and spirally lirate within. Alt. 5.6, diam. 6.3 mm.

Compared with *M. nucleus* Phil., this species differs in being smaller, with the whole sculpture much fainter, subobsolete. It is also more depressed, and the umbilicus widens more at the opening.

Clanculus gemmulifer var. *pallidus* n. v.

Differs from *gemmulifer* by its pale, yellowish-brown tint, with roseate apex, and some indistinct, paler, radial flames; only a few of the liræ having sparse black beads, each between two white ones.

Kashiwajima, Tosa. Types no. 85221 A. N. S. P., from no. 9106 of Mr. Hirase's collection.

MISS S. F. PRICE.

We learn with deep regret of the death, at her home at Bowling Green, Ky., on July 3d, of Miss Sadie F. Price. Miss Price was born at Bowling Green. Her parents were Alexander M. and Marie Price. For many years Miss Price had been actively interested in the flora of her State, upon which she published a number of articles, among them a useful illustrated work, "The Fern Collector's Handbook." Ornithology also claimed her attention, and in the last dozen years she became interested in mollusks, and becoming acquainted by correspondence with conchologists working upon inland species, she collected assiduously and successfully, publishing a list of her local collections in this journal for November, 1900. Miss Price assisted upon the Kentucky exhibit at the Columbian Exposition, where she exhibited plants and a series of paintings of the birds of Kentucky, which attracted much attention. Like a true naturalist, Miss Price passed on to many pupils the love of nature. She is survived by her sister, Miss Mary Price, with whom she had lived for many years.

GENERAL NOTES.

HELIX HORTENSIS AT PERCE, P. Q.—Dr. John M. Clarke reports this species as very common in the limestone regions at Perce, Gulf of St. Lawrence. A specimen sent is of the five-banded form.—H. A. P.

PROF. T. D. A. COCKERELL, of East Las Vegas, New Mexico, has removed to Colorado Springs, Colorado.

REV. A. B. KENDIG, of Brookline, Mass., has sold his large collection of land shells to the Franklin and Marshall College, Lancaster, Pa.

THE largest fresh-water pearl on record was found at Genoa, Wisconsin, by seventeen-year-old Frank Hastings while he was fishing. It weighs 185 grains and is pure white. It measures $\frac{1\frac{5}{6}}$ of an inch in diameter. A local dealer bought the pearl, just as it was when it came from the shell, for \$2,675.—*Cleveland Leader*.

MRS. S. L. WILLIAMS, of Chicago, has recently added to her large and beautiful collection of *Cypridæ* a specimen of *Cypræa broderipii* Gray. We believe this is the only specimen in America.

PUBLICATIONS RECEIVED.

A NEW LAND SHELL FROM CALIFORNIA. By Paul Bartsch (Proc. Biol. Soc. Wash., xvi, pp. 103, 104, 1903). *Sonorella walcottiana* is described from Palm Springs, San Diego Co., where it occurred in crevices of rocks.

ON SOME ADDITIONAL FOSSILS FROM THE VANCOUVER CRETACEOUS, WITH A REVISED LIST OF THE SPECIES THEREFROM. By J. F. Whiteaves. (Geological Survey of Canada, Mesozoic Fossils, vol. i, part 5, pp. 309-415, plates 40-51.)

This part is similar to the one published in 1879, consisting of a report of the many collections received since that time. Some 27 species of *Cephalopoda* are recorded, including six new species. The *Gastropoda* are represented by 35 species, 12 of which are new. *Scaphapoda* two species, and *Pelecypoda* 48 species, 10 being new to science. The synonymy and bibliography is given in full and the illustrations are excellent. The work is a valuable contribution to American palæontology.—C. W. J.

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SOME NOTES ON THE GENUS *FULGUR*.

BY CHAS. W. JOHNSON.

In the very interesting and valuable paper, "Studies of Gastropoda II, *Fulgur* and *Sycotypus*," by Amadeus W. Grabau (Amer. Naturalist, August, 1903), the author has again brought to generic rank the name of *Sycotypus*. No stronger evidence is brought forth to uphold this view than that already given, viz., the character of the protoconch, as pointed out by Conrad. Dr. Dall and others consider the condition of Conrad's specimens to have been pathologic, while the many tertiary forms seem to completely bridge all distinguishing conchological characters, leaving only the ciliated periostratum, a feature which is lost in the fossils and in *Fulgur pyrum* is often obsolete or wanting. Still *Sycotypus*, as a rule, forms a recognizable group, very convenient in tracing the origin of many of the species.

Has the protoconch of *F. pyrum* been studied? It may have no bearing on the subject, but it is interesting to note that while the egg-capsules of *F. canaliculatum* are readily distinguished from *F. carica* and *F. perversum* by having a single-keeled edge, those of *F. pyrum* are biangular, resembling those of *F. perversum* in miniature.

In tracing the ancestral relations of the various so-called species, Mr. Grabau has brought out many points which deserve careful consideration. Every one who has made a study of the tertiary species probably has a different view in regard to the relationship of the various forms, and these views should be freely given and the consensus of opinion adopted.

All agree that the Eocene *Levifusus* is probably the immediate

ancestor of *Fulgur*, the latter being first represented in the Oligocene and Lower Miocene by *F. spiniger* and its several varieties, and in the middle Miocene by *F. fusiformis*.¹

From this form was probably derived, as Mr. Grabau states, "the large and ponderous *Fulgur maximum* Conr.," which apparently, through the varieties *tritonis* and *filosum*,² leads to the recent *F. carica* and its variety *eliceans*. On the other hand, the sinistral form undoubtedly evolved from *F. maximum* in the upper Miocene much earlier than Mr. Grabau's table would imply, and by forms such as *F. adversarium* and *F. obfilosum* leads directly to the recent *F. perversum*, and its rare variety *kieneri* Phil. presenting exact parallels to the *F. tritonis filosum* and *F. carica eliceans* series, thus strengthening the theory of a common ancestry. During the Pliocene, *F. perversum* seems to have extended and found more favorable conditions further south, for it is really more plentiful and better developed in the Caloosahatchie than in the Waccamaw beds. On the gulf coast at the present time it is more abundant than on the Atlantic, while *F. carica* is not found at all in the Gulf of Mexico.

In the Caloosahatchie beds there appeared a new form, *F. rapum* Heilp., probably derived from *F. perversum* (as such forms of *perversum* as Mr. Grabau has called *obrapum* would indicate) and apparently representing a reversion to the *maximum* type.

I would not consider *obrapum* to be sinistral *rapum*, neither would I consider *obfilosum* to be a sinistral *filosum*; for while admitting a common ancestry, the immutability of the recent *perversum* and *carica* has given us reason to believe that the same stability has existed since they originated. To admit the mutability of sinistral and dextral forms only makes "confusion worse confounded." *F. rapum*, through the form *tritonoides* Grabau, leads to the recent *F. coarctatum* Sowerby of the Gulf of Mexico, an extremely rare shell which may possibly be extinct. The long anterior canal of the monstrosity *F. candelabrum* Lam., as figured by Kiener, indicates a position here, rather than under *eliceans*.

¹ In a bed which overlies the Chipola and having an out-crop in a mill-race two miles east of Argyle, Fla., I found this species, identical with specimens from St. Mary's, Md.

² *F. filosum* did not originate in the upper Miocene, as indicated by Mr. Grabau's table; *F. maximum*, *tritonis* and *filosum* are all associated with *F. incile* at Yorktown, which moreover is the type locality for *filosum*.

The *Sycotypus* group probably originated, as Mr. Grabau suggests, with such forms as *F. burnsii*, *perizonatum* and *tampaensis* in the Upper Oligocene (Lower Miocene?) and *F. coronatum* and *rugosum* in the Middle Miocene. It seems rather a doubtful conclusion to refer to *F. rugosum* as the direct ancestor of *F. canaliculatum*. I have not seen the "Faison variety" of *F. canaliculatum* referred to, but I am inclined to consider *F. alveatus* and *incile* as intermediate forms and to trace the line of ancestry of *F. canaliculatum* and *pyrum* through the same formations in which I trace *F. carica* and *perversum*, viz., the Miocene of Virginia and North Carolina and the Pliocene of the Waccamaw and Caloosahatchie.

The typical *F. incile* of Yorktown seems to have evolved into two forms in the Duplin county beds; the one, *F. conradii*¹ Tuomey and Holmes, leads to the so-called *canaliculatum* Contr., the type of which is the *F. canaliculatum* T. & H., from the Waccamaw, and in no way separable from the recent form. The other form, derived from *incile*, represents a very mutable species, and to the various forms had been applied the names of *F. carolinensis*, *excavatus*, *elongatus* and *pyriformis*. These exhibit, however, all gradations and extend through the Pliocene to the recent *F. pyrum* Dillw.

F. concinnum does not belong to the "Middle Miocene." The type locality is Sampson Co., N. C., and I found it also along the Cape Fear River, ten miles above Elizabethtown, Bladen Co., in a bed typically Duplin. I do not know the forms which Conrad described as *amœnum* and *Kerrii* and a study of the form from Walker's Bluff, N. C., might throw additional light on the subject.

THE GREATEST AMERICAN PLANORBIS.

BY HENRY A. PILSBRY.

Planorbis magnificus n. sp.

The shell is very large and high, sinistral as usual, the upper or spire half yellow or pale brown, the lower or umbilical half dark brown. Surface glossy, finely marked with growth-lines, and usually some spiral series of minute long granules, as in many species of pond

¹ That *F. conradii* represents an intermediate form between *incile* and *canaliculatum* is clearly shown by a series in the Joseph Willcox collection of Fulgurs, presented to the Academy of Natural Sciences, Philadelphia.

snails (but without thread-like striae such as *Planorbis trivolvis* has). Spire narrow, deeply sunken, with steep sides; the summit of the whorls acutely angular. Umbilicus deeply funnel shaped, the base of the whorls so narrowly rounded as to appear almost angular. Whorls nearly 5, the last very large, rounded at the periphery, somewhat flattened and sloping above, more convex below it. Aperture but slightly oblique, irregularly ovate, angular or subangular above, broadly rounded below, the peristome slightly expanded.

Diam. 36, height 24.5 mm.

Diam. 34, height 22 mm.

Lower Cape Fear River in the vicinity of Wilmington, North Carolina, collected by Mr. Wm. P. Seal.

This species is remarkable not more for its size than for the great width, far exceeding any other species. It differs from *P. trivolvis*, *ammon* and their allies in the surface sculpture and narrower umbilicus. *Planorbis corpulentus* Say is also somewhat related, but its differential features will be obvious in a comparison with Mr. Bryant Walker's illustrations and description of that species, NAUTILUS XIII, p. 133, plate 3 (April, 1900).

OBSERVATIONS ON THE BYSSUS OF UNIONIDÆ.

BY L. S. FRIERSON.

Recently, while collecting young or very small *Unionidæ*, two species were obtained having a byssus. Seven or eight specimens of *Lampsilis texasensis* Lea, were taken so provided, and one specimen of *Lampsilis fallaciosus* Simpson. The *L. texasensis* varied from one-eighth to one-half inch in length, while the *L. fallaciosus* was five-eighths of an inch long.

The size of the shell and the length of the byssus did not appear to bear any constant ratio, nor did the size (or diameter) of the byssus vary. The most of the *texasensis* and also the *fallaciosus* were taken by means of a combination flour scoop and sieve such as is used in our kitchens. This was used to scrape up the bottom, and then the mud washed out leaving the larger stuff behind. In this way the original position occupied by the shells could not be ascertained; but several specimens were taken attached to sticks, and these were hanging suspended in the water clear of the bottom.

The byssus was attached to the soft parts at about one-fourth distance from the anterior to the posterior end.

One of the *texasensis* had a byssus cylindrical in shape, about half the diameter of a human hair laid alongside for comparison. But that of the others and also of the *fallaciosus* was roughly ribbon-shaped, and resembled a flat piece of "molasses pulled-candy," both in texture and in contour. While wet they were very elastic, but exceedingly brittle when dry, appearing to be of the same composition as the ligament of the shell. These ribbons were irregularly twisted, now to the right, now to the left, as well as vertically undulatory. This gave them a sort of spiral spring effect which was quite noticeable.

The proximal end, when separated from the soft parts by slight traction, was bulb-shaped and attached to a style-like process which occasionally could be drawn from between the valves. My appliances were not equal to the task of determining whether this process was an outgrowth of the foot or of the mantle. The distal ends were attached to quite a little raft of heterogeneous material, and I believe that this "raft" serves to make a float, analogous to the balloons by which spiders sail through the air in the autumn months. None of them seemed to be directly fastened to any large body such as sticks or old shells, but merely entangled with the moss or algae growing on the sticks, etc. The lengths of these byssi were about three to eight inches.

Several very small *Quadrulas* were taken. But no byssus was noted on any of them. Could this feature be a characteristic of *Lampsilis* and closely allied genera?

A NEW GUPPYA FROM FLORIDA.

BY HENRY A. PILSBRY.

Guppya miamiensis n. sp.

The shell is perforate, almost exactly like *Guppya gundlachi* in shape, size and color; glossy and smooth, with *no trace of spiral lines*, even under high magnification. Alt. 1.5, diam. 2.3 mm., whorls $3\frac{3}{4}$.

Miami, Dade Co., Florida. Types no. 77083 A. N. S. P., collected by S. N. Rhoads, 1899.

In Mr. Rhoads' list of Miami shells, published in a former num-

ber of this journal, this was listed as *G. gundlachi*. Mr. Geo. H. Clapp, who obtained some of Rhoads' specimens, directed my attention to its distinctness. *G. gundlachi* occurs at a neighboring locality, Lemon City, Fla., as well as throughout the St. John's valley, and in west Florida—probably extending all over the peninsula. It was collected by Mr. Singley at Hidalgo, Texas, and is a well-known West Indian and Mexican species. *G. gundlachi* is invariably characterized by the presence of a sculpture of very minute regular and close, spiral striæ, as mentioned in the descriptions of Pfeiffer, von Martens and others, and as I have confirmed in numerous specimens from Florida, Texas, Mexico and the West Indies.

NEW LAND SNAILS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota luhuana yakushimana n. var.

Shell small with conic spire, yellowish red-brown or bright yellowish green, indistinctly streaked with darker or sometimes with two or three bands faintly indicated; wrinkle striate with dense fine spiral lines as usual. Whorls $5\frac{1}{2}$, the last very deeply descending below the periphery of the preceding whorl. Umbilicus very narrow and rapidly contracting within. Aperture nearly horizontal, the upper and lower margins subparallel; peristome narrowly reflexed, thickened within.

Alt. 17.5, diam. 23, width of umbilicus 2 mm.

Alt. 17, diam. 23, width of umbilicus 2.5 mm.

Yakushima, Osumi. Types no. 85752 A. N. S. P., from no. 895 of Mr. Hirase's collection.

This race has the small, contracted umbilicus of *E. l. nesiotica*, but it differs in the very small size and conic spire.

Ganesella moellendorffiana n. sp.

Shell openly umbilicate, depressed, with low conic spire, the base concave around the moderately open umbilicus, one-tenth the diameter of the shell; thin, reddish brown, with a narrow, darker band above and a pale band at the periphery. Surface glossy, weakly marked with growth-wrinkles and densely engraved with minute, spiral lines. Whorls 6, convex, very slowly and regularly increasing, the last but

very slightly descending anteriorly, very slightly angular in front, becoming rounded. Aperture lunate, moderately oblique; peristome thin, narrowly reflexed. Alt. 20.5, diam. 29.6, width of umbilicus 3 mm.

Amagisan, Izu. Type no. 85753 A. N. S. P., from no. 1140 of Mr. Hirase's collection.

This is one of the finest of the *japonica* group of species, resembling *G. jacobii* in contour, but much larger, with a comparatively wider umbilicus and darker in color. It is named in honor of Dr. O. von Moellendorff, in whose untimely death malacology has lost one of the most acute and industrious authorities upon Oriental snails.

Pristiloma japonica n. sp.

Shell minute, imperforate, discoidal, the upper surface very low, conoidal, base convex, periphery rounded; pale yellow, somewhat translucent, glossy and almost smooth, very faintly striate radially above. Whorls $5\frac{1}{2}$, slowly widening, slightly convex, the base impressed in the center. Aperture nearly vertical, narrowly lunate, the outer lip acute and thin, strengthened a short distance within by a white, callous ridge, showing as a buff streak outside; columellar margin narrowly reflexed at the insertion. Alt. 1.5, diam. 2.7 mm.

Toya, Kuziro, in eastern Yesso. Types no. 85754 A. N. S. P., from no. 1146 of Mr. Hirase's collection.

It is impossible to say whether this is really a *Pristiloma* until the jaw and teeth can be examined; but from the close resemblance of the shell to *P. lansingi*, the generic reference seems probable. There is no Oriental group to which it could properly be referred, to my knowledge. It is a new generic type for Japan.

NEW PISIDIA.

BY V. STERKI.

Pis. complanatum n. sp. Mussel inequipartite, slightly oblique, moderately inflated; superior margin short, somewhat curved, with rounded, more or less projecting angles at the scutum and scutellum; posterior part short, truncate, passing with a rounded angle in the inferior margin, which rises in a strong curve to the rounded-angular anterior end; supero-anterior slope not well marked, slightly curved;

beaks rather posterior, projecting over the hinge margin, slightly bulging anteriorly and posteriorly, flattened laterally; surface with very fine, almost regular striae and a few faint lines of growth, with a slight, silky gloss; color light to brownish-horn; shell scarcely translucent; nacre thin, with the muscle insertions visible but not impressed; hinge slight to moderately stout, plate rather narrow, right cardinal tooth curved, occupying the whole width of the plate, its anterior end abruptly thick and grooved or bifid, its ends are connected by the sharp, inferior edge of the plate, thus forming a groove; left anterior cardinal tooth short, curved or angular, the posterior quite short, small, oblique; lateral teeth moderately stout, with short, pointed cusps, the outer ones of the right valve quite small but distinct; ligament short, comparatively stout.

Long. 3.2, alt. 2.8, diam. 1.8 mill.; long. 2.7, alt. 2.4, diam. 1.6 mill.

Habitat: Little Black Creek and lakes in Muskegon Co., Michigan, sent by Mr. Bryant Walkèr.

This species is different and distinct from all our *Pisidia*. It somewhat resembles *P. ultramontanum* Pr., but is much smaller, its beaks are narrower, of different shape and more prominent. Some of the specimens from the creek are higher over the beaks and in the posterior part, and thus the mussel is of a rather different shape. In others, the beaks are less flattened, laterally.

Pis. rowelli n. sp. Mussel well inflated, elliptical-ovate in outline, angles at scutum and scutellum slightly projecting, broadly rounded; posterior margin just perceptibly subtruncate, supero-anterior slope slightly marked; beaks a little posterior ("in normal position"), large, rounded, projecting over the hinge margin; surface shining, slightly and irregularly striate, with a few coarser lines of growth; horn colored to brownish over the beaks, usually with a lighter zone along the margins, not sharply defined; shell translucent, rather thin; hinge slight, plate rather narrow; right cardinal tooth angular, with its posterior part thicker and grooved, left anterior short, triangular, placed high up on the plate, the posterior much longer, oblique, curved; lateral teeth with rather short, abrupt cusps in the left valve; the outer ones in the right valve small; ligament slight.

Long. 7.5, alt. 6.2, diam. 4.5 mill.

Habitat: Near Sisson, at the foot of Mount Shasta, California, collected by Rev. J. Rowell.

This large and beautiful *Pisidium* cannot be mistaken for any other species. It seems to be related to *abditum* Hald., and some of the old-world *Pisidia*. Young specimens are very little inflated, and of a light, almost whitish color.

Pis. cuneiforme n. sp. Mussel inequipartite, oblique, moderately to rather well inflated, mostly so near the beaks; hinge margin slightly curved, the angles at the scutum and scutellum projecting; anterior part considerably longer, attenuated, somewhat cuneiform, and directed downward, the end rounded, supero-anterior slope well marked, straight or slightly curved; posterior part short, subtruncate; beaks moderately large and slightly elevated over the hinge margin; surface finely and irregularly striate, pale to yellowish horn-colored, or whitish, dull to shining; shell opaque to subtranslucent, thin; hinge slight, short, plate narrow; cardinal teeth placed far towards the anterior, well formed; the right curved, its posterior part slightly thicker and grooved; the left anterior well curved, the posterior slightly so, almost longitudinal and above the anterior, long; right lateral teeth slight, cusps low and rounded, the outer ones well formed; in the left valve the cusps are short, high, abrupt, pointed; ligament slight.

Long. 2.8, alt. 2.4, diam. 1.8 mill.

Habitat: Michigan and Minnesota. In Michigan: Byer's trout pond, Kent Co.; Blue Lake and Green Creek, Muskegon Co.; Hess Lake, Newaygo Co.; Lake Michigan, at High Id. Harbor. Clear-water River, Stearns Co., Minn. Collected by Messrs. Bryant Walker, H. E. Sargent and R. G. Kirkland.

Specimens were received in 1895, and again in '98 and '99, and then regarded as representing a distinct species. Yet the number of specimens from each place being limited, it seemed advisable to wait for more materials.

Pis. cuneiforme has some resemblance with *P. subtruncatum* Malm. and (var.) *cuneatum* Blz., of Europe; but the beaks are broader, less elevated; the surface striation and appearance are different, and the young of both show more differences between each other than the adult. Of our North American species, it has resemblance only with some forms of *P. compressum*, but our species is much smaller and its anterior part is longer, comparatively. Young and half-grown specimens are comparatively shorter, less inequipartite and less oblique.

A well-marked feature of the hinge is, as it seems, the relative position of the teeth, the distance between the cardinals and posterior lateral cusps being twice as long as that between the cardinals and anterior laterals. In other species, *e. g.*, *Pis. compressum*, *variabile*, *noveboracense*, that difference is much less marked, and in *P. virginicum* the cardinals are about equidistant from the laterals.

NEW LAND SNAILS FROM SOUTH AMERICA.

BY C. F. ANCEY.

Epiphragmophora orophila Anc.

Testa umbilicata, umbilico margine columellari fere prorsus ob-
tecto, depressa, solidula, subnitida, fusco-olivacea, supra medium
fascia fulva cincta, supra oblique et irregulariter striata, striis rugi-
formibus, subtus exilioribus, præterea passim et minute malleata
atque spiraliter infra impressiuscula. Spira convexa, obtusa, late
subconoidea. Anfractus $5\frac{1}{4}$ convexi, sutura impressa, in ultimo sub-
irregulari discreti, ultimus relative magnus, antice sat breviter de-
flexus. Apertura obliqua, transverse oblonga, intus fuscula, fascia
transmeante. Peristoma album, incrassatum, anguste expansum,
basi reflexum et intus dilatatum, ad columellam late supra umbilicum
eversum, marginibus sat remotis, basali declivi.

Diam. $29\frac{1}{2}$, min. 24, alt. 16 mill.

Hab. in Andibus Peruviae.

This shell, received by MM. Sowerby and Fulton as *E. clausom-
phalos* (?), Dev. & Hupé, is quite unlike the latter, but is related to
a species of smaller size that one of these gentlemen sent me some
years ago as *E. Farrisi* Higg., or rather *E. Higginsi* Pfr., the former
name being preoccupied. However it does not seem to correspond
with the original diagnosis. The present species is larger, its sur-
face is rough but of a plain brown color, ornamented with a brown
band and the umbilicus is nearly closed.

Epiphragmophora Turtoni Anc.

This I have described in the journal as probably Bolivian, but
subsequently my friend Mr. Gude has described from Paraguay an
E. Dormeri, which appears to be very close to it and of which I have
seen the type in his collection. Both are probably from the same

country. *E. turtoni* is larger, a trifle more depressed, and is furnished with a single median brown band. Otherwise the two species are very much alike.

Porphyrobaphe sarcoctoma, n. sp.

Testa imperforata, solida, ovato-oblonga, nitida, striis incrementi lævibus oblique notata, in parte infera ultimi anfractus obsolete et superficialiter lineis spiralibus vix impressa, sub epidermide lutescente fuscula vel cinereo-fulva, atque strigis seu lineis undulatis vel fulguratis crebre picta, præterea obscure saturatius 3 vel 4-fasciata, fasciis ob lineas persæpe interruptis, duabus primis in anfractibus superis continuatis, apice pallido. Spira conoidia, modice elongata, obtusa. Anfractus $6\frac{1}{2}$ convexiusculi, duo primi microscopice punctati, ultimus regulariter oblongus, ad aperturam brevissime ascendens. Sutura parum profunda, inferne (an casu fortuito?) impresso marginata. Apertura subobliqua, elliptico-oblonga, intus cœrulescenti-albida, fauce nitida, fusco-carnea; superne angulata, postice ad basin columellæ tantisper subangulata. Columella intus plica supra medioeri alba oblique ascendente munita, postea subarcuata. Peristoma callosum, crassum, undique breviter expansum et reflexum, albido-carneum, ad basin dilute fuscum, marginibus callo valido ejusdem coloris junctis.

Long. 74, lat. 31, alt. apert. (oblique, cum perist.) $33\frac{1}{2}$ mill.

Hab. in Colombia (?).

I saw only one example of this beautiful species and it is in my collection. I can compare it with no other, the color of lip and throat being a striking feature.

(*To be continued.*)

MRS. HENRIETTA H. T. WOLCOTT.

We regret to chronicle the death of Mrs. Henrietta H. T. Wolcott, of Dedham, Mass., following a severe accident. She passed away after much suffering, October 8th, in the 78th year of her age. Mrs. Wolcott was deeply interested in the study of nature, was a proficient botanist, and of late years interested in Conchology. A wide traveler, she was never happier than when engaged in gathering interesting material suitable for educational purposes; and many small, well-

chosen school collections were given by her to educational institutions and public schools. In the course of her travels she frequently obtained new or rare specimens which she shared with cordial pleasure with those students to whom they were of special interest. Her last contribution of this kind was the *Sonorella Wolcottiana* from Palm Springs, in the desert region of southeastern California. Philanthropic work also claimed much of her attention, to which she brought a mind clear and sensible, broadened by experience of many years at home and in distant countries. Mrs. Wolcott was the daughter of Joseph and Eleanor Eustis, of Boston, and the widow of the late John W. Wolcott. She leaves a son and two daughters, besides many, not bound by ties of relationship, yet who will remember her as a friend, benefactor, or co-laborer.—W. H. D.

NOTES AND NEWS.

SHELLS OF DOUGLAS CO., CENTRAL WASHINGTON.—Prof. R. E. Snodgrass collected a small series of shells at Grand Coulee, Blue Lake, in July, 1902, comprising the following species.

"Pyramidula" strigosa Gld. (small var.).	Planorbis trivolvis var. horni Tryon.
Agriolimax campestris Binn.	Planorbis parvus Say.
Succinea nuttalliana Lea.	Physa triticea Lea.
Succinea gabbi Tryon.	Pisidium compressum Prime,
Limnæa nuttalliana Lea.	Pisidium sp. undet.
Limnæa adelinae Tryon.	
Limnæa near sumassi Bd.	

This locality must be near or at the western limit of *P. strigosa*. Specimens are in the coll. of the Washington Agricultural College at Pullman, Wash., and that of the Academy at Philadelphia.—H. A. Pilsbry.

SCHISMOPE RIMULOIDES (Cpr.) at San Diego.—This species was described by Carpenter as a *Scissurella*, from Mazatlan. In examining some specimens sent some years ago as "*Vanikoro?*" by Henry Hemphill, I found that they were the species named above. I do not know that this genus has been reported from California hitherto.—Pilsbry.

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A NEW CALIFORNIAN TRIVIA.

BY WILLIAM J. RAYMOND.

During the summer of 1901 the University of California, with the financial aid of friends in Los Angeles, maintained a Marine Biological Laboratory at San Pedro, California, and carried on biological exploration along the coast from Redondo to Newport, around Catalina Island, and from Los Coronados Islands to La Jolla in the vicinity of San Diego. The large gasoline launch "Elsie" was chartered for the summer and equipped with apparatus for the study of the physical environment of marine life, including depth, temperature and salinity of water and character of bottom. Collections of specimens were made within the regions named, from shore-line to an extreme depth of 100 fathoms. For this purpose the launch was provided with a winch and rope, dredges, trawls, tow-nets and receptacles for the preservation of the specimens. The molluscan collections, which were large and interesting, were placed in the writer's hands for identification and report. In advance of a complete report it is desirable to put certain observations on record, among them the descriptions of new species encountered. A previously known but undescribed species of *Trivia* is:

Trivia ritteri n. sp. Shell small, white, form ovate, inflated, anterior extremity slightly produced, spire completely covered, but rather prominent, base convex, outer lip margined, strongly sculptured with about twenty, smooth, sharp ribs, much narrower than the interspaces which are nearly flat and scarcely roughened by irregular rugæ parallel to the axis of the shell, no sulcus, the ribs continuing

unchanged in width across the back, except that occasionally a few ribs near the spire are interrupted at the median line; a few short intercalary ribs are usually present on the sides of the shell; aperture rather wide, armed with 17 to 18 denticulations on the outer lip, and 14 to 16 on the inner. Two extreme specimens in size measure: length 11.5, breadth 8.6, height 7.2 mm.; length 9.2, breadth, 6.5, height 5.7 mm.

Catalina Island, 60 fathoms (Cooper); Monterey (Dall); Cortez Bank, 54 fathoms (Dall); Catalina Island near Avalon, 40 fathoms (Sta. 21, U. C. M. B. L.); off San Pedro, about 50 fathoms (Sta. 83, U. C. M. B. L.).

A dead specimen and a fragment of a second, collected more than thirty years ago by Dr. Cooper, as cited above, but wrongly identified as *Trivia sanguinea* Gray, are now in the museum of the University of California. If the admission of *T. sanguinea* to the Californian fauna rests solely upon this identification, the name should be removed from our lists. See Cooper's Geographical Catalogue of the Mollusca Found West of the Rocky Mountains, 1867, No. 626.

To Dr. Dall is owing the citation of localities which considerably extend the known range of *T. ritteri*. A specimen was submitted by Dr. Dall to Mr. J. Cosmo Melvill, of Manchester, England, who considered it new after comparison with *T. multilirata*, *europæa*, *candidula*, *pellucidula*, etc. In the character of the ribs it somewhat resembles *T. buttoni* Melv., but differs in color, being white instead of straw-colored, in having about twenty instead of fourteen ribs, and in its size, the latter species being 5.5 mm. in length. *T. ritteri* differs from *T. europæa* in the ribs, which in the former species are less numerous, sharp, and much narrower than the interspaces, while in the latter they are more rounded and wider. The shell of the latter is also more inflated. From *T. panamensis* Dall, the present species differs in much greater size and more numerous ribs. It gives me great pleasure to dedicate this beautiful species to Professor William E. Ritter, in charge of the University of California Marine Biological Laboratory at San Pedro, 1901.

ANNIE M. LAW.

For much of our knowledge of the mollusk fauna of east Tennessee and western North Carolina we are indebted to two ladies, Miss

ANNIE M. LAW and MRS. GEORGE ANDREWS. Before them, RUGEL had made a beginning in this beautiful but difficult mountain country. Until FERRISS and his friends began their explorations, these three enthusiasts were the only naturalists to exploit the region for land mollusks.

Miss Law¹ came from distinguished English ancestry. Her parents were John and Ann Law, of Carlisle, England. Her uncle, Richard Law, was governor of Malta. Other relatives who rendered services to the State were Chief Justice Lord Ellenborough, the Bishop of Bath and others. The Law family records were destroyed during the Civil War, so that the exact date of Miss Law's birth cannot be ascertained; but her father, John Law, came to America about 1850, Miss Law being about nine years old at that time.

"Mr. Law located some nine miles from the town of Maryville, Blount county, Tenn., a wild, mountainous country, though there was a watering-place about two miles distant where the *elite* of the South came through the summer for health and rest. Otherwise our neighbors were illiterate. There were no schools or churches, so that our parents were our teachers and companions. My father died in 1852 or '53. During his lifetime on the farm, my sister would ride into Maryville and recite Latin and algebra to Dr. Anderson (the founder of Maryville Theological Seminary) once or twice a week. Then moving into the town, she still continued these studies. She passed the examination for teaching school, and received a certificate at the age of thirteen. Being large for her age, she was given a school. She was proficient in music and gave lessons.

"Through Col. W. G. McAdoo, of Knoxville, she was introduced to Dr. James Lewis, of Mohawk, N. Y., who wished her to collect shells. She had from childhood a taste for shells, mineralogy, entomology, botany, in fact everything connected with nature. She began a correspondence with Dr. Lewis about 1868, which continued until his death. She had also a number of other correspondents in America and abroad.

"I might write a long story about some of her trips while collecting. After being in California four years, she returned to Tennessee and spent several months there. On one occasion, Dr. Lewis wished some

¹ The following account is from data and a biographical sketch furnished by Mrs. Fannie Law Andrews, Miss Law's younger sister.

particular shell from Bald Mountain in the Great Smoky Mountains. She procured a young man friend and two horses, and setting out from Concord, Knox county, went to the top of the Big Bald and procured the shells desired. They had to spend the night there. During the night there was a terrific thunder-storm far beneath them. She never enjoyed a trip more. Another trip she made in Monroe county was from Jalapa to Telico Plains. The distance was not great, but it was a bitter cold morning, the banks of the river covered with ice. She wore rubber boots, and wading in, got beyond her depth; but she got the shells. On this trip, I was her companion. As there was no house on the side I was on, I followed with bare feet. She suffered very much, not having dry footwear; but we soon reached a comfortable fire at a friend's, dried our things and were made comfortable. My sister never seemed to think of her own comfort when engaged in the search for shells. Many such exposed trips she made, the effects of which I think undermined her health.

"When she returned to California the second time, I was with her. We came by way of Mohawk, N. Y., visited the family of Dr. Lewis, and had the pleasure of seeing his collection. We also made a flying trip to Florida, visiting Jacksonville, St. Augustine, Palatka and Silver Springs. Wherever we were, she collected shells."

In California, Miss Law made her home at Watsonville, Santa Cruz county, with her sister, Mrs. Andrews, until her death, January 12, 1889.

Among the species discovered by her are *Gastrodonta acerra*, *Vitrinizonites latissimus*, *Polygyra chillhoweensis* and *P. lawi*.

NOTE ON MUREX MARCOENSIS SOWERBY.

BY FRANK COLLINS BAKER.

In the Journal of Malacology, volume 7, p. 162, Mr. G. B. Sowerby has described a *Murex marcoensis* from Marco, Florida. This form was previously noted by Dr. W. H. Dall and the writer of this note, it being considered by them a color variety of *Murex messorius* Sowerby. Dr. Dall, in speaking of *Murex messorius* says (Bull. Mus. Comp. Zool., v. 18, p. 196), "The Florida specimens are often of a deep rose-pink." In Trans. Acad. Sciences, St.

Louis, the writer remarked on p. 377, "Dr. W. H. Dall has characterized a variety *rubidum*, from Cedar Keys, Florida, the shell being of a deep pink color." The writer was in error in stating that Dr. Dall had characterized the variety *rubidum*, he having simply referred to the rose color.

The history of this variety will therefore stand as follows:

1889. Dall: *Murex messorius* (Sowb.) Reeve, pink variety, Bull. Mus. Comp. Zool., v. 18, p. 196.

1897. Baker: *Murex messorius* (Sowb.) Reeve, var. *rubidum* "Dall," Trans. Acad. Sci., St. Louis, v. 7, p. 377.

1900. Sowerby: *Murex marcoensis*, Journ. of Malacology, v. 7, p. 162.

If the two forms are the same, which I have no reason to doubt, it will stand as *Murex messorius* var. *rubidum* Baker.

NEW LAND SNAILS FROM SOUTH AMERICA.

BY C. F. ANCEY.

Porphyrobaphe galactostoma Anc.

P. galactostoma Anc. in Bull. Soc. Malac. Fr., 1890, p. 153 (juv.).
P. yatesi Pfr. var. *albolabris* Dohrn, in Cat. Staudinger.

Testa imperforata, solidula, subglutinosa nitens, oblongo-attenuata, vix lineis incrementi notata, epidermide luteo-virenti induta, fasciis 4 badiis (supera angusta, infera late sed parum distincta), strigis fulguratis luteis interruptis in ultimo anfractu eximie picta, fasciis 2 superis in anfractibus prioribus conspicuis. Spira conoidea, regulariter attenuata, apice obtuso, pallide lutescenti-albo, microscopice punctato-rugoso seu vermiculato. Anfractus $6\frac{1}{4}$ convexiusculi, sutura lineari, albida, infra linea fusca marginata, ultimus oblongus, ad aperturam breviter ascendens. Apertura subobliqua, inferne distincte recedens, elliptico-oblonga, utrinque angustata, ad basin columellæ angulata, nitide lactea, fauce alba. Columella superne late calloso-plicata, postea fere recta, cum basi sinulum latum efficiens, expansa et dilatata. Peristoma candidum, callosum, late expansum et reflexum, nitidum, marginibus callo eximie candido junctis.

Long. 78, lat. 33, alt. apert. (oblique cum perist.) 38 mill.

Hab. Eastern Peru (fide Staudinger).

This is closely allied to *P. sublabeo* Anc., *P. vicaria* Fult., and *P. Yatesi* Pfr., all from Peru, but is remarkable for its pure white reflected lip. It was originally described from a juvenile specimen, imperfect in several respects.

Porphyrobaphe victor Pfr.

I secured an authentic specimen of *P. Augusti* Jouss. (Bull. Soc. Zoöl. de France, 1887, p. 1, pl. III, fig. 10), and cannot see that it differs from Pfeiffer's species.

Bulimulus Blanfordianus, n. sp.

Testa anguste et obtecte rimata, oblongo-attenuata, parum solida, lineis incrementi grossiusculis, sub suturam pliculosis, infra et prope aperturam lævioribus, et striis exilibus, in ultimo anfractu parum conspicuis crebre sculpta, castaneo-fulva, punctulis luteis parvis passim notata, apice nudo, pallide fusciscente. Spira conica, lateribus convexis, acutiuscula. Anfractus $6\frac{1}{4}$ convexiusculi, ultimus oblongus, subattenuatus. Apertura distincte obliqua, intus nitide cœrulescens, ovalis, supra attenuata. Peristoma simplex, obtusum, margine dextro regulariter convexo, basali rotundato, columellari dilatato, perforationem fere omnino tegenta, adnato, lacteo, dextro et columellari callo cœrulescente junctis. Columella intus pliciformis, spiraliter recedens.

Long. 55, lat. $25\frac{1}{2}$, alt. apert. $27\frac{1}{2}$ mill.

Hab. Iquico, Bolivia, 3500 met. above the sea (fide Fulton).

A very large *Bulimulus*, respectfully dedicated to Mr. W. T. Blanford, the well-known writer on Indian shells. It is closely allied to *Bulimulus anthisanensis* Pfr., from Ecuador, but is much larger and more capacious. In that respect it resembles *B. inca* d' Orb., more than any other species from the same country, but the two species are clearly distinct.

A NEW SCISSURELLA FROM PATAGONIA.

BY PAUL BARTSCH.

Scissurella dalli spec. nov.

Shell minute, moderately elevated, whorls increasing uniformly and rapidly in size from the extreme apex to the aperture. Nepionic

whorls one and one-half, not enlarged, dextral, translucent, shining, without sculpture. Post-nepionic whorls two, decidedly inflated, with the slit about half way between the suture and the periphery, open only in about one-twelfth of the last turn, marked on the rest as a narrow, moderately deep, depressed groove, which is bounded on each side by a raised thread. The remaining ornamentation of the whorls consists of feeble, raised, equally-spaced, axial riblets, which follow the curve of the outer lip. These riblets are best developed between the suture of the whorls and the slit, becoming enfeebled toward the periphery and quite obsolete on the base. In addition to these, a few ill-defined spiral lirations manifest themselves under high magnification between the suture and the slit. Suture strongly impressed. Periphery of the last whorl well rounded. Base rather depressed and somewhat concave toward the umbilical region, marked by the faint continuation of the axial riblets and many exceedingly fine spiral striae. Umbilicus narrow, deep, bounded by a weak basal fasciole. Aperture large, broadly pyriform with continuous peritreme, posterior angle obtuse, somewhat patulous anteriorly; outer lip thin; columella oblique, thin; parietal wall distinct, reflected upon the body whorl, partly closing the umbilicus.

The type is in the U. S. Nat. Museum collection, No. 171400, and comes from the Gulf of St. George, Patagonia. It measures, long. 0.8 mm., diam. 1.4 mm.

GENERAL NOTES.

VITRINA DEPOSITING EGGS.—You may be interested to know that on November 8th, and again to-day (November 15th), I found *Vitrina limpida* Gld., depositing their eggs. The eggs are white, almost round, some of them being slightly pointed at one end, and about 1 mm. in diameter. They are laid in bunches of six or eight, under rotting wood on the ground.

In the ten years during which I have been watching this "colony," I have never seen a young shell, but think the eggs are hatched in the early spring, the snails reaching maturity in the autumn. From October to January is their active season, and during those three months they can be found moving around on any pleasant day. Have found them very active when the temperature was below 40°.—GEO. H. CLAPP, EDGEWORTH, PA.

PUBLICATIONS RECEIVED.

MOLLUSKS OF OUR SOUTHEASTERN COAST.—The United States National Museum has recently published a reprint of its Bulletin No. 37: "A preliminary catalogue of the shell-bearing marine mollusks and brachiopods of the southeastern coast of the United States, with illustrations of many of the species," by William Healey Dall. The first edition of this work, published in 1889, having become exhausted, the reprint has been found advisable to meet the requests for copies.

The body of the reprint is a verbatim copy of the earlier edition, but the usefulness of the work has been much increased by the addition of 21 new plates, containing 188 figures.

It is a classified list of the shell-bearing marine mollusks found between Cape Hatteras and Mexico. For each species the author has indicated the extreme northern and southern range, and some of the more important intermediate localities; the range in depth; the range in time, and its occurrence in Europe, if it be known to occur there. The average length of specimens of part of the species is given. 95 plates, containing many hundreds of excellent figures, illustrate a great many of the species. The reprint is obtainable by those properly entitled to receive it.—W. B. M.

LIST OF BRITISH NON-MARINE MOLLUSCA.—By B. B. Woodward (Journal of Conchology, x, pp. 352-367, Oct. 1, 1903). British conchologists have been among the most conservative in matters of nomenclature and taxonomy. For many years it seemed that no material innovation from the arrangement in Jeffrey's British Conchology could obtain recognition in the non-marine mollusks of the tight little isle. In the last few years all this has been changed. The great progress of malacological science abroad and the revival at home, signalized by the formation of the liveliest Malacological Society in the world, has finally lead to the revision of the British list now before us. The general classification followed is that of Fischer, but greatly modified in details of family and generic divisions. A few points of especial interest to American conchologists may be mentioned here. The name *Vitrea radiatula* is preferred to that of *V. hammonis*. Mr. Woodward concludes that "there is a costate form of *Vallonia* in America distinct from the

costate variety of *V. pulchella* present in Britain, and I recommend that until it can be demonstrated more conclusively than has at present been done that there are two British species, the costate form be classed as a variety of the typical *V. pulchella*." The name *Tachea* being preoccupied for a genus of birds, *Cepæa* Held is substituted. The nomenclature of "*Buliminus*" is discussed, and that name is replaced by *Ena* of Leach, and the family name is changed to *Enidæ*. *Pupa* is discussed at length. It appears that that name was first used for species of *Actæon* and *Cerion*, and finally by Draparnaud for what is now known as *Pupa*. Mr. Woodward concludes that *Jaminia* Risso, 1826, is the earliest available name for the *Pupa muscorum* group.

In the Basommatophora, *Phytia myosotis* replaces the familiar *Alexia*, preoccupied in Coleoptera, and *Ovatella* takes the place of *Leuconia*, being earlier. *Planorbis glaber* Jeffr. is definitely separated from the American *P. parrus*. Mr. Woodward disputes the propriety of Dall's course in substituting *Corneocyclos* for *Pisidium*, but otherwise the generic nomenclature of bivalves calls for no special comment.

Mr. Woodward uses the emended forms "*Dreissensia*," "*Vivipara*," "*Aplecta*" and "*Assemanina*," a course against the general usage in this country.—H. A. PILSBRY.

ON SOME MOLLUSCA KNOWN TO OCCUR IN INDIANA.—By W. S. Blatchley and L. E. Daniels (27 Ann. Rep. Dept. Geology and Nat. Resources of Indiana for 1902). This paper of 100 pp. is supplemental to the report on Indiana mollusks by Dr. R. E. Call, published in 1899. Some 92 species are added to the fauna of the State, a large number of them being figured and all described. Some little known or new forms are among those illustrated, such as *Succinea calumetensis* Calkins, *Limnæa woodruffi* Baker, *Ancylus shimekii* Pils., *Lithasia obovata biconica* and *Goniobasis indianensis* Pils., various *Pisidia* described recently by Sterki, *Lampsilis blatchleyi* Daniels, etc., so that the report is of general interest to those studying our inland mollusks.

The same Annual Report includes A CHECK LIST OF INDIANA MOLLUSCA WITH LOCALITIES, by L. E. Daniels. 277 species have been ascertained to occur within the State.

CONTRIBUTIONS TO THE TERTIARY FAUNA OF FLORIDA.—By Wm. H. Dall. Trans. Wagner Free Institute of Science, Philadelphia, vol. iii, pt. vi.

This constitutes the concluding part of Dr. Dall's extensive work. The entire volume (iii) comprising 1654 pages and 60 plates, constituting the most valuable and exhaustive treatise on the American Tertiary fauna ever presented, and forming a work indispensable both to the conchologist and palæontologist.

Parts I and II are devoted to the Gastropoda, and the remaining parts to the Pelecypods, Part III being given up entirely to a new classification of the latter. All the parts as they have appeared have been reviewed in the pages of THE NAUTILUS.

The present work takes up the family *Veneridæ*, with a history of the various generic names employed; most of the changes in nomenclature have, however, been noted in the "Synopsis of the Veneridæ" (Proc. U. S. Nat. Mus., xxvi, 335), but this work in many cases covers the ground more thoroughly, giving the complete generic and specific synonymy of many of the recent forms which extend into the tertiary. 41 new species are described.

In the family *Lucinidæ* there are 33 new species, and in the *Chamidæ* seven. The subgenus *Echinochama* Fischer is given generic rank. The family *Carditidæ* is also well represented in the tertiary, 18 new species being described. The *Cyrenidæ* contains several new forms, the section *Cyrenodonax* Dall., the type of which, *C. formosana* Dall, n. sp., "Recent in Formosa, at the mouth of the Tamsui River," is described in a foot-note. *Miodontopsis* is proposed for *Miodon* Sandberger 1870, not of Carpenter, 1865. *Igeria* Roissy is adopted in place of *Galatea* Brug. (*Galathea* Lam.) 1803, not Fabr. 1793. Type *G. radiata* Lam.

In regard to the small fresh-water forms usually referred to the *Cyrenidæ*, Dr. Dall says: "While closely related, it seems more convenient to place *Sphaerium* and *Corneocyclas* (= *Pisidium* Pfeiffer) in a separate family," *Sphaeriidæ*.

Crassatellites Krüger 1823, which supplants *Crassatella* Lam. 1801, not of Lam. Prodrome 1799, is largely represented in the American tertiary. The recent *C. floridana* Dall, described from a young shell, proves to be the same as *C. gibbesii* T. & H. *Crassinella* Guppy is given only subgeneric standing. *C. humulatus* Conr. is restricted to the fossil, the recent form being *C. mactracea* Linsley.

The *Astartidæ* number 22 species, of which seven are new. *Cyclas* Bruguiere 1798 (1st species *Venus islandica* Linn.) replaces *Cyprina* Lam. 1818, and is located with *Trapezium* and *Coralliophaga* in the family *Pleurophoridæ*. *Pandora carolinensis* Bush is considered the same as the Miocene *P. arenosa* Conr. *Laternula* Bolten 1798 = *Anatina* Lam. 1809.

To the readers of THE NAUTILUS the many recent changes in nomenclature may, perhaps, be better understood by the following extract from the author's preface: "In the years which have elapsed since this Memoir was begun, the subject of zoölogical nomenclature has been much discussed and the general consensus of opinion seems to trend towards the acceptance of names for which no diagnosis was originally supplied, provided the species cited under them are identifiable. This change from the British Association rules of 1842 is responsible for much unnecessary overturning of formerly accepted names with no visible benefit to science, but since it appears to express the will of the majority, it seems useless to oppose it, and in Parts IV-VI it has been complied with, except in the case of the anonymous auctioneer's catalogue, known as the 'Museum Calomnianum.' This compilation from a manuscript of Hwass, edited by Da Costa, and printed for the auctioneer, George Humphrey, has usually been credited to the latter. I confess, my desire to settle the nomenclature on a firm basis, though great, has not been equal to the acceptance of these anonymous, undefined, worthless names, which would involve the loss of much that is fundamental in the nomenclature of mollusks. I still hope that the common sense of naturalists will find a way—if necessary, an arbitrary way—to eliminate this publication from authorized sources of nomenclature. The 'Museum Boltenianum' stands on a different footing, and the principal change which its acceptance involves in the earlier part of this work is the substitution of the name *Busycon* for the more familiar *Fulgur*."

The part closes with a "Discussion of the Geology," followed by descriptions of the several stages or horizons and lists of the species recognized in each, also a summary in tabular form, showing the relations of the faunas to one another. Some idea of the amount of labor involved in preparing this great work may be derived from a foot-note on page 1552: "It may be of interest to note that during the progress of this work approximately eight thousand three hundred and fifty species have been discussed or compared, and eight

hundred and sixty new forms described. More than fifty new group-names, from sections to genera, have been proposed, and more than five times as many reduced to the rank of synonyms as unnecessary or belated. The number of species known at present between the beginning of the Oligocene and the present fauna is between three and four thousand, probably less than half as many as will eventually be obtained and discriminated."

The richness of the tertiary fauna is clearly shown by the lists of species, the bed of the Caloosahatchie River alone containing 639 species, of which 48 per cent. are recent and 28 per cent. are peculiar to the bed. From the Chipola beds 333 species are recorded, about one-half being peculiar to it, thirty-five species surviving to the existing fauna. The Oligocene marl of Bowden, Jamaica, is also very productive, thus far yielding 435 species, of which 12 per cent. appear to be identical with recent species.—C. W. J.

A LIST OF SPECIES OF MOLLUSCA FROM SOUTH AFRICA, forming an appendix to G. B. Sowerby's Marine Shells of South Africa. By EDGAR A. SMITH (Proc. Mal. Soc., London, v, 354-402, pl. xv). This valuable fauna list enumerates 390 species, including over 300 species not in Mr. Sowerby's work. Nine species are described as new. The region covered includes only the coasts of Cape Colony and Natal. It may be of interest to know that the so-called *Fulgur africanus* Sowb., based on a half-grown shell in poor condition, is a *Fusus*; a figure given of the adult shell shows a columellar callus detached from the whorl at the lower part, forming an umbilical rimation.—C. W. J.

DESCRIPTIONS OF SIXTY-EIGHT NEW GASTROPODA FROM THE PERSIAN GULF, GULF OF OMAN, AND NORTH ARABIA SEA. By JAS. COSMO MELVILL and ROBT. STANDEN. (Ann. and Mag. of Nat. Hist., Ser. 7, vol. xii, pp. 289-324, pl. xx-xxiii.)

This paper contains some very interesting forms, among them two species of the genus *Homalaxis*, a species of *Scissurella*, one *Kleinella*, and a *Fluxina*. All of the species are excellently figured.—C. W. J.

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GUNDLACHIA AND ANCYLUS.

BY WM. H. DALL.

During the last ten years I have frequently announced to acquaintances and assistants interested in conchology, my belief in certain propositions hitherto unsupported by proof, bearing on the so-called genus *Gundlachia*, viz:

1. That *Gundlachia* is merely an *Ancylus* which has under favorable circumstances been able to form a calcareous epiphragm and survive the winter, which ordinarily kills the great mass of individuals, and, while retaining the shell of the first year, to secrete an enlarged and somewhat discrepant shell during its second summer.

2. That not all *Ancyli* necessarily have the ability to do this, but the practice may have developed in certain small species; and in tropical regions where the dry season takes the place of winter it is possible that survival may become more or less habitual with some of these species, though evidence of this is still needed.

On no other hypothesis could I account for the fact that single specimens, or a small lot of specimens on a single occasion (after a specially favorable season?), of *Gundlachia* have been reported from various parts of the world and described as species, but which nobody has been able to find a second time or in any considerable numbers. Also that the young *Gundlachia* cannot be distinguished from an *Ancylus* and usually resembles some common species of *Ancylus* of the same ponds in which the *Gundlachia* appears; while the only species which have been repeatedly collected as *Gundlachia*

come from tropical or southern countries. There is nothing distinctive in the radula or soft parts of *Gundlachia*, as far as yet observed, to separate it from the analogous *Ancylus*.

A paper which, for the first time, brings to bear on this hypothesis facts which seem to render it sufficiently acceptable to publish, has been contributed by Erland Nordenskiöld to the *Zoologische Anzeiger*, XXVI, pp. 590-593, July, 1903, with seventeen figures. In this paper to which the reader may profitably refer, a process such as my hypothesis assumes is fully illustrated in *Ancylus moricandi* d'Orbigny, from the Chaco region of Brazil, up to the point of the completion of the epiphragm and the determination of the identity of the forms bearing it with the typical first year *Ancylus*. The formation of the second-year shell or *Gundlachia* by these individuals, alone remains to be demonstrated to establish the hypothesis as a fact.

NOTES ON THE STRUCTURE OF THE SHELLS OF UNIO.

BY L. S. FRIERSON.

The shells of *Unio* are stated by most authors to be composed of three layers, known as the "epidermis," the "columnar" or "prismatic" layer, and the "nacreous," or simply called the "nacre." As a matter of fact, however, these shells are composed of four layers, the nacre being composed of two distinct layers. These may be readily noted in a polished section of some thick-shelled species, and especially if a species be chosen, such as *Obovaria retusa Lamarck*, showing the two layers in different colors. A clearer idea of the two layers may be obtained if the secreting "mantle" be studied. This part of the animal, though called by a single name "mantle" really is composed of two distinct portions, and should have two names. That portion extending from the beaks to the pallial line is thin, and one is tempted to say structureless, while from the pallial line to the margin, it is thickened, and plentifully supplied with nerves and muscles. The extreme edge of this is thickened, and secretes both the epidermal and columnar layers. From this edge to the pallial line is secreted a layer of nacreous material which may be called the extra-pallial layer. If a section of any thick-shelled species be made, it can easily be seen that the

elements of growth of this layer are *diagonal* to the general surface of the shell. From the pallial line to the beaks is deposited the fourth, or intra-pallial layer—the elements of which are parallel to the general surface. The sectionized shell will show the extra-pallial layer wedge-shaped, with the apex at beak, and base occupying the distance from the pallial line to the margin, while the intra-pallial layer is also wedge-shaped, with its apex at the pallial line.

Because the pallial line is composed of very many small muscle-scars disposed in a line, if the two layers could be separated, a sur-



face would be exposed “radially ridged.” Sometimes, by decay, this separation is effected, partially, near the beaks, and the “false beaks” so exposed are strikingly “radially ridged”—so much so as to deceive an expert like Dr. Lea. If a thick-shelled *Unio* like *Quadrula trigona* be burnt, this structure can be very readily demonstrated.

It is not impossible that this appearance of decayed or fossilized *Unios* has given rise to the opinion, as stated by Mr. Chas. T. Simpson, that the primeval *Unios* were provided with “radial beak-sculpturing.” The difficulty experienced by every collector of obtaining living shells showing beak-sculpturing, and the *a priori* improbability of fossil shells retaining this very perishable character, lends an air of probability to the above theory, which may be further strengthened by the curious fact that *no* North American *Unio* retains the slightest tendency to show their beaks so sculptured.

LAND SHELLS OF MT. DESERT, MAINE.

BY H. S. COLTON.

On Mt. Desert Island last summer I found land shells in six localities. At Hall's Quarries I found *Zonitoides arboreus* near the shore at the edge of the woods. From Seal Harbor I received *Vitrea hammonis* Strom, *Pyramidula striatella* Anth., *Helicodiscus lineatus* Say and *Carychium exiguum* Say. At Coryledge point under boards within a yard or two of the place where the beach began, I found

Pupa muscorum in untold numbers, *Cochlicopa lubrica* Müll, *Vitrea hammonis* Strom, *Zonitoides arboreus* Say and *Succinea obliqua* Say. At Southwest Harbor Village, under planks, by the road-side I found:

<i>Vitrea hammonis</i> Ström.	<i>Vertigo ventricosa</i> Morse.
<i>Zonitoides arboreus</i> Say.	<i>Sphyradium edendulum</i> Drap.
<i>Zonitoides milium</i> Morse.	<i>Cochlicopa lubrica</i> Müll.
<i>Vitrina limpida</i> Gld.	<i>Pyramidula striatella</i> Anth.
<i>Euconulus fulvus</i> Müll.	<i>Vallonia excentrica</i> Sterki.
<i>Strobilops labyrinthica</i> Say.	

The great majority of the species that I found were in Sea Wall and McKinley Villages. These two villages were about three miles apart. Here the conditions were the same. New board-walks were being built along the road and the planks of the old one were thrown into the gutter and into the adjoining fields. I found the following under these boards or in the grass near the boards:

Sea Wall Village.	McKinley Village.
<i>Vallonia excentrica</i> Sterki, abun.	<i>Vallonia excentrica</i> Sterki.
<i>Pupa muscorum</i> L., abundant.	<i>Vertigo ventricosa</i> Morse.
<i>Cochlicopa lubrica</i> Müll, abun.	<i>Cochlicopa lubrica</i> Müll.
<i>Vitrina limpida</i> Gld. abun.	<i>Vitrina limpida</i> Gld.
<i>Vitrea hammonis</i> Ström.	<i>Vitrea hammonis</i> Ström.
<i>Euconulus fulvus</i> Müll.	<i>Euconulus fulvus</i> Müll.
<i>Zonitoides arboreus</i> Say.	<i>Zonitoides arboreus</i> Say.
<i>Zonitoides exiguus</i> Stimp.	<i>Agriolimax agrestis</i> L.
<i>Agriolimax compestris</i> Binn.	<i>Agriolimax compestris</i> Binn.
<i>Pyramidula striatella</i> Anth.	<i>Pyramidula striatella</i> Anth.
<i>Helicodiscus lineatus</i> Say.	<i>Helicodiscus lineatus</i> Say.
<i>Succinea obliqua</i> Say.	<i>Succinea obliqua</i> Say.
<i>Succinea avara</i> Say.	<i>Succinea avara</i> Say.
<i>Acanthinula harpa</i> Say.	<i>Acanthinula harpa</i> Say.

I visited a number of islands but explored only a few carefully. I spent an hour on the evergreen woods of Suttons and found a few *Zonitoides arboreus* Say. An hour on Baker's Island, an hour on Black Island and six hours on Little Goat's Island, revealed me nothing. On Little Ram Island, a rock about a hundred feet long covered with about three feet of soil which supports a number of dead spruce trees, I got *Zonitoides arboreus* and *Succinea obliqua* under some dead wood. On Greening's Island, where I lived and explored

most carefully, I discovered two specimens of *Succinea avara* Say under a board in a swamp. On Little Cranberry Island, under boards near the woods, I found :

<i>Cochlicopa lubrica</i> Müll.	<i>Agriolimax compestris</i> Binn.
<i>Vitrea hammonis</i> Ström.	<i>Pyramidula striatella</i> Anth.
<i>Euconulus fulvus</i> Müll.	<i>Succinea avara</i> Say.

With the exception of the places where the board-walk was being repaired, land shells were the most plentiful on great Cranberry Island. The island is shaped like the letter G and is about four miles long. I explored the western part of the island or the back of the G most carefully. The western shore is composed of ledges of solid rock behind which lies an extensive bog. Where the rock wall is low the surf has built "sea walls" by piling up cobblestones, making a steep beach back of which lies the swamp. This swamp and the higher places near the shore are covered with grass, on top of which the sea in times of storm has cast old planks, stumps, boxes and all kinds of rubbish. It was under these that the shells were found. There was one exception however. *Pyramidula alternata* Say, I found under stones. I found them within a foot of where the vegetation ended and the rocks began that went down to the sea. Indeed all the species enumerated below were found within twenty feet of the beach. Sprinkled through the grass are the shells of *Buccinum undatum*, *Littorina* and *Mytilus edulis*. Some have been washed up, others have been carried by the crows and gulls. It has been suggested that it is owing to the abundance of calcium carbonate in the soil due to these decomposing shells that land shells are so very abundant at the edge of the sea.

<i>Vallonia costata</i> Müll.	<i>Agriolimax compestris</i> Binn.
<i>Pupa muscorum</i> L.	<i>Pyramidula alternata</i> Say.
<i>Cochlicopa lubrica</i> Müll.	<i>Pyramidula striatella</i> Anth.
<i>Vitrea hammonis</i> Ström.	<i>Helicodiscus lineatus</i> Say.
<i>Zonitoides arboreus</i> Say.	<i>Succinea obliqua</i> Say.
<i>Euconulus fulvus</i> Müll.	

Little Duck Island lies about eight miles to the southward of Mt. Desert and is the most isolated that I visited. It is about a half a mile in diameter and is half covered with a dense growth of woods, principally spruce. Half is bare of trees and is covered with coarse grass, granite ledges out-cropping here and there. Between the woods and the field there is an area of trees. It was here under

sticks that I found nearly everything. I did however find *Zonitoides arboreus* Say and two specimens of *Helix hortensis* and *P. alternata* Say away from any trees. A year ago *Succinea obliqua* was found in great abundance around a spring, but I did not notice them there this year. This year I found them in the area of dead wood.

Pupa muscorum L.

Helix hortensis Müll!

Cochlicopa lubrica Müll.

Pyramidula alternata Say.

Euconulus fulvus Müll.

Pyramidula striatella Anth.

Zonitoides arboreus Say.

Helicodiscus lineatus Say.

Vitrea hammonis Ström.

Succinea obliqua Say.

NEW LAND SNAILS FROM SOUTH AMERICA.

BY C. F. ANCEY.

Bulimulus ephippium Anc.

Testa anguste et profunde perforato (perforatio supra columellari margine oblecta), conoideo-ovata, tenuissima, papyracea, sericea, parum micans, pallide fulvo-lutea, concolor, obsolete et oblique pliculosa, plicis parum regularibus. Spira regulariter conoidea, apice obtusiusculo, microscopice spiraliter striato atque longitudinaliter undulato. Anfractus 6 convexiusculi, sutura impressa, ultimus amplus, initio vix subangulatus, subattenuatus, antice leniter et longiuscule deflexus. Apertura ovata, superne subattenuata et angulata. Peristoma tenue, brevissime expansiusculum, haud reflexum, margine columellari late in trianguli forma dilatato, callo parietali nullo.

Long. $20\frac{1}{2}$, diam. 12, alt. apert. (oblique) $11\frac{1}{2}$ mill.

Hab. Bahia, Brazil (teste H. Fulton).

This is a member of the Eudiopius section.

Bulimulus goniotropis, n. sp.

Testa angustissime perforata, pyramidata, fulvo-cornea, concolor, tenuis, microscopice et confertim spiraliter impressa, striis vix perspicuis, haud profunde incis, lineis incrementi obliquis subnotato, nitidula. Spira regulariter conica, producta, lateribus rectis, apice sat minuto, oblique et flexuose costulato et striis microscopicis spirilibus sculpto. Anfractus 7 planiusculi, regulariter crescentes, sutura appressa linea impressa marginata divisi, ultimus medio angulatus, infra convexo-declivis, supra angulum vix convexus. Apertura ob-

liqua, emarginato-ovalis, extus laud angulata. Peristoma subincrassatum. Undique breviter patens, ad basin et columellam magis dilatato-expansum, marginibus distantibus, supero strictiusculo, columellari supra perforationem in trianguli forma reflexo.

Long. $20\frac{1}{2}$, lat. $11\frac{1}{2}$, alt. apert. (oblique) $10\frac{1}{2}$ mill.

Hab. Espirito Santo, Brazil.

In texture like *B. pileiformis* Moric., but in general form more like *B. perlucidus* Spix.

Odontostomus squarrosus, n. sp.

Differt a peraffini *O. exeso*, Spix, impressionibus testæ magis numerosis, parvulis, minus elongatis, testa subinde minus undata, plica columellari debiliore, dente supero marginis dextri magis oblique sito, minore ac minus lato; cæterum *O. exeso* simillima. An ejus varietas?

Long. $39\frac{1}{2}$, lat. $14\frac{1}{2}$, alt. apert. (perist. incluso), $18\frac{1}{2}$ mill.

Hab. Brazil.

Odontostomus glabratus, n. sp.

Testa oblongo-fusiformis, perforata, solidula, nitidula, lævigata, obsolete sed in anfractibus prioribus distinctius suboblique striatula, alba, cinereo irregulariter multinotata et strigata. Spira conoideo-attenuata, apice sat minuto, sub lente costulato. Anfractus 9 convexiusculi, sutura impressa, simplici discreti, ultimus ovato-oblongus, ampliusculus, latere dextro depressus et late scrobiculatus, basi parum attenuatus. Apertura superne angulata, subovalis, fere recta, ringens, scilicet: dente lamelliformi parum crasso in pariete, plica columellari supera oblique intrante, dente basali uno sulco extero correspondente et dentibus 2 in margine dextro, primo parvulo, secundo majore, in medio sito. Peristoma expansum, prope insertionem strictiusculum, postea leviter angulatum, marginibus remotis, callo incrassato junctis.

Long. 25, diam. 9, alt. apert. $8\frac{1}{2}$ mill.

Hab. Sierra de Cosquina, Argentina.

Intermediate, as it were, between *O. Wagneri* Pfr., and *leptodon* Mart.

Odontostomus Deraini Anc.

Testa rimato-perforata, fusiformis, subnitida, sordide alba, corneo vel cinereo (statu emortuo) conspersa et irregulariter strigata, con-

fertim et oblique rugoso-plicata, rugis infra magis lævibus. Spira elongata, conoideo-attenuata, producta, apice obtuso, sat parvo, quasi subtruncato, sub lente microscopice costulato. Anfractus 9, convexiusculi, sutura impressa, ultimus oblongus. Apertura irregulariter ovalis, supra angulata, basi ad columellam leviter angulata, parum obliqua, ringens, scilicet: dente lamelliformi magno, compresso in pariete, plica columellari supera oblique intrante, subquadrata et mediocri; dente basali acuto, scrobiculo extero profundo correspondente; et dentibus 2 in margine dextro, primo minutissimo, secundo majore plicæ columellari opposito. Peristoma initio strictum, tum undique expansiusculum, subincrassatum, album, marginibus callo nitido junctis.

Long. 22, diam. $6\frac{3}{4}$, alt. apert. 7 mill.

Hab. Sierra de Cosquina, Argentina.

Allied to *O. Ríojanus* Doering, but larger and with different aperture.

Odontostomus gemellatus Anc.

The ground color is brownish in fresh specimens, not white as in the type (a bleached example). A small tooth is sometimes present just above the large columellar plate. The apex is like in *O. punctatissimus* Lea.

Porphyrobaphe sarcostoma Anc.

Since I sent the diagnosis of *Porphyrobaphe sarcostoma*, I have seen the figures given in the *Manual of Conchology* of some varieties of *P. Yatesi*, and acknowledge that my specimen was an extreme form of Pfeiffer's species.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Japonia toshimana n. sp.

Shell narrowly umbilicate, turbinate, covered with a dark brown cuticle, roughened by delicate wide-spaced thread-like or lamellar striæ and two series of long curved bristles near the periphery. Spire conic. Whorls nearly 5, the first $2\frac{1}{2}$ rounded, the next subangular in the middle, the last obsoletely biangular, fringed at the angles. Aperture slightly oblique, circular, the peristome simple

and thin, in contact with the preceding whorl for a short distance above. Alt. 5, diam. 5 mm.

Toshima, Izu. Types no. 85755 A. N. S. P., from no. 1133 of Mr. Hirase's collection.

This species is larger and more conspicuously fringed than *J. sadoensis*, and darker colored. It does not correspond to any of the species described by Gould.

Eulota (Aegista) kobensis var. *discus* n. var.

This form is *almost flat above*, though the individual whorls are convex. The last whorl is *angular at the shoulder*, and very convex. beneath. The *umbilicus is extremely wide* and shallow, its width contained $2\frac{1}{2}$ times in that of the shell.

Alt. 5.5, diam. 17, width of umbilicus 7 mm.; whorls $5\frac{3}{4}$.

Alt. 6, diam. 16, width of umbilicus 6 mm.; whorls $5\frac{1}{2}$.

Amasaki, prov. Tosa. Types no. 85770 A. N. S. P., from no. 1108 of Mr. Hirase's collection.

Eulota (Eulotella) commoda var. *izuensis* n. var.

The shells of this race are similar to *E. commoda* from Kayabe, Ojima except in having a much narrower umbilicus. Alt. 5.5, diam. 7, umbilicus 1 mm. wide.

Oshima, Izu. Types no. 85790 A. N. S. P., from no. 1138 of Mr. Hirase's collection.

Eulota (Plectotropis) shikokuensis var. *hadaka* n. var.

Differs from *Plectotropis shikokuensis* by having comparatively few long low tubercles in place of the dense clothing of scales of *shikokuensis*, and there is no peripheral fringe.

Irazuyama, Tosa. Types no. 85802 A. N. S. P. from no. 1099 of Mr. Hirase's collection. (*Hadaka*, naked.)

Eulota endo n. sp.

Shell narrowly umbilicate, depressed-globose with low conic spire; chestnut brown, glossy, smooth except for slight growth-lines. Spire conoidal, the apex obtuse. Whorls 5, slowly and gradually increasing, a little convex, the last convex peripherally, very slightly descending in front. Aperture oblique, rounded-lunate, the peristome thin, narrowly expanded, the columellar margin dilated and white. Alt. 5.7, diam. 7 mm.

Seta, Omi. Types no. 85784 A. N. S. P., from no. 1113 of Mr. Hirase's collection.

This small, pea-like species differ from *E. commoda* (A. Ad.) by its much less convex whorls (*Endo* a pea).

Trishoplita mesogonia var. *minima* n. var.

This race differs from *T. mesogonia* in being much smaller, with the peripheral angle decidedly weaker. It is thin, pale brown or brownish corneous, with a tendency to be paler below the suture, and frequently with some whitish spots there; whorls $5\frac{1}{2}$.

Alt. 6.5, diam. 8.5 mm.

Alt. 6, diam. 8 mm.

Tokushima, Awa (Shikoku). Types no. 84713 A. N. S. P., from no. 832 of Mr. Hirase's collection.

Macrochlamys izushichitojimana n. sp.

Shell minutely perforate, depressed, with low conoid spire and a distinct peripheral angle in front, the last whorl becoming rounded on the latter part; very thin, brown, somewhat translucent. Surface somewhat glossy, sculptured with irregular, low, coarse wrinkles along the growth-lines above, smoother and more glossy beneath. Whorls $4\frac{3}{4}$, slowly and regularly increasing. Aperture lunate, the lip simple and acute, with a small triangular dilation at the axial insertion.

Alt. 3.8, diam. 6 mm.

Miyakejima, Izu. Types no. 85944 A. N. S. P., from no. 1058a of Mr. Hirase's collection. Also occurs on Nijima, Hirase's no. 1058, the specimens being slightly smaller with $4\frac{1}{2}$ whorls, and a little paler.

This species is related to *M. semisericata*, but it is larger with more elevated spire, rougher surface and a distinct peripheral angle.

Macrochlamys decens n. sp.

Shell minutely perforate, depressed, biconvex, the spire low conoidal, the periphery obtusely angular, and the base convex; thin, amber-brown, somewhat translucent. Surface somewhat glossy, with slight, irregular sculpture of fine growth-wrinkles. Whorls fully 6, convex, very slowly and regularly increasing. Aperture lunate, the peristome simple and acute, with a small triangular dilation at the axial insertion, the columella noticeably thickened within. Alt. 3.3, diam. 5.3 mm.

Omi-mura, Echigo. Types no. 85782 A. N. S. P., from no. 1119 of Mr. Hirase's collection.

This species of the *Discoconulus* group is larger than most other Japanese forms of that type, and has more numerous closely-coiled whorls than the related species.

Punctum infans n. sp.

Shell depressed, openly umbilicate, chestnut brown, the inner whorls corneous; sculptured with irregular, low and curved, rather widely spaced, obliquely radial wrinkles, which are nearly obsolete beneath, where a faint, close and fine spiral striation may be seen. Spire flattened, the inner whorls projecting slightly. Whorls 3, the last wide, obtusely angular at the periphery, much more convex beneath. Peristome thin and acute. Alt. 1, diam. 1.9 mm.

Hachijo, Izu. Types no. 85781 A. N. S. P., from no. 1067a of Mr. Hirase's collection.

This shell is more angular than the allied *P. amblygonum*. The generic reference is uncertain.

Kaliella sororcula n. sp.

Shell minutely perforate, trochiform, the spire conic with very slightly convex lateral outlines and obtuse apex, base convex; thin, brown, nearly lusterless above, the base somewhat glossy. Whorls nearly 6, convex, the last with an acute, thread-like peripheral keel, which may usually be seen in the suture of the preceding whorls. Aperture oblique, rather narrow. Peristome thin and acute, the columellar margin arcuate, narrowly reflexed and thickened. Alt. 3, diam. 4.8 mm.

Amasaki, Tosa. Types no. 85771 A. N. S. P., from no. 1109 of Mr. Hirase's collection.

With the shape of *K. (?) ceratodes* Gude, this species lacks the brilliant gloss of that, the surface being dull, like the much larger *K. gudei* Pils. and Ilir., and it is seen to be faintly striatulate under a strong lens.

PUBLICATIONS RECEIVED.

THE PALEONTOLOGY AND STRATIGRAPHY OF THE MARINE PLIOCENE AND PLEISTOCENE OF SAN PEDRO, CALIFORNIA.—By Ralph Arnold (Mem. Cal. Acad. Sciences III, 1903). 4to, 420 pp., 37 plates. This important work, which has engaged Mr. Arnold's attention for some years, consists of three parts, of which Part I is devoted to general descriptions of the Pliocene and Pleistocene beds, their stratigraphy and faunal relations. Mr. Arnold concludes that during the latter part of the Pliocene the climate was much colder than at present, 18.5 per cent. of the species of the

Deadman Island Pliocene being now found living only to the north, many of them not south of the Puget Sound district. During the Pleistocene, warmer climate ensued, the upper San Pedro beds indicating more tropical conditions than those now prevalent. The marine Pleistocene has been found to be enormously developed on the West Coast.

Part II, the descriptions of species, occupies the greater portion of the volume. Nearly all of the species are fully described, and illustrated by good pen-drawings. Since most of the forms are still living, the full descriptions and illustrations will render the work of great use to students of the recent shells of the West Coast; and it should have a wide circulation among West Coast conchologists. Many new forms are described, a large proportion of which will doubtless be found to be also recent. The nomenclature is fairly brought up to date, but there are some exceptions which one might reasonably expect to see corrected, such as the retention of *Trophon belcheri* in "*Chorus*," the use of "*Ranella*" for *Gyrineum*, of "*Hipponyx*" for *Amalthea*, and of "*Phorcus*" for *Chlorostoma pulligo*. Neither of the species *bimaculata* and *callomarginata* belongs to *Clypidella*, as was shown over ten years ago. The Chitons seem to have gone astray as to family classification. The two species of *Planorbis* described and figured are incorrectly named. In the *Scaphopoda*, Mr. Arnold admits *Dentalium hexagonum* Sby. and *D. pseudo-hexagonum* Dall, placing *D. neo-hexagonum* S. & P. in the synonymy of both. The fact is that *hexagonum* is an oriental species not found in California, and *pseudo-hexagonum* is a MSS. name, not before published. The common Californian species is rightly known as *D. neo-hexagonum*. Similarly, *Cadulus fusiformis* S. & P., a species published and figured some years ago, is placed in the synonymy of the hitherto undefined MSS. name "*C. nitentior* Cpr." The figure and description given fix the name *nitentior* on what seems to be the tube of a serpulid annelid. Notwithstanding these and various other oversights, the nomenclature is in the great majority of species abreast of the times. Among many interesting facts brought out, is the absence of *Haliotis* before the Pleistocene in Californian strata. The plates illustrate not only the fossils, but also characteristic views of the principal terranes.

Part III, bibliography, gives a useful list of works dealing with West Coast mollusks, including a complete bibliography of the writings of Dr. R. E. C. Stearns.—H. A. P.

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No. 10.

SHELL COLLECTING DAYS AT FRENCHMANS' BAY.

BY DWIGHT BLANEY.

It is with the desire to return some of the pleasure the writer has derived from the interesting accounts of collecting trips which have appeared in the NAUTILUS, that the following description of a dredging trip in Frenchmans' Bay, Maine, has been written:

Taking a calm morning, with the tide nearly at low-water mark, we start off in a small scow in tow of our fifty-foot steamer. A calm day is to be preferred, as the labor is much reduced, a rough sea making it very uncomfortable in the pitching scow.

The scow is fitted with seats, and gives us plenty of room to coil the 100 fathoms of rope, places for pails, tubs and sieves, with safe corners for glass jars of sea water. We usually dredge in what we know as good fishing-ground, as more shells are found in such places, though all kinds of bottom are tried.

The dredging stations for the day are planned beforehand and we look forward with no little anticipation to the hauling up of the dredge.

We are always hoping to find alive the *Pecten islandicus*, *Thracia conradi*, or the *Aporrhais occidentalis*, as we have only dredged dead specimens before; and the chance of adding new species to our collection keeps us continually hard at work.

To-day we try first, some hard bottom off the northern end of Long Porcupine Island and the first haul brings in about a dozen fine live specimens of the large scallop, the *Pecten tenuicostatus*. This

great scallop, six or seven inches in diameter, is good eating, and we lay them aside to appear later in a different form on the breakfast table. The large stones and dead shells are looked over carefully and we find attached to them the *Crucibulum striatum*, and the Chitons, *Tonicella marmorea*, *Tachydermon albus*, and the *Tachydermon ruber*. On a previous trip we dredged a single, fine specimen of the *Hunleya mendicaria*. This rare Chiton is usually found in much deeper water than the bay.

The remaining sand and mud is now poured into large sieves with handles and looked over carefully. We find alive the beautiful *Margarita obscura*, *Margarita undulata* and *Margarita cinerea*. These are not uncommon, however, and are hurried into the glass jars of water, to be studied later under the microscope. We are always glad to find the *Scalaria groenlandica*, though we find few alive. Many kinds of *Bela* are found, among which are the common *Bela incisula*, also the *Bela scalaris*, *Bela harpularia*, *Bela pleurotomaria*, and the more rare *Bela violacea* and *Bela gouldii*. Also in this section we find the *Velutina halioidea*, *Trichotropis borealis*, and the *Lunatia groenlandica*, and the *Trophon clathratus*.

The contents of the sieves are now washed over the side of the scow; the mud washed away and the cleaned sand and shells poured into pails, labelled with the station, depth of water and character of bottom, to be looked over after being dried at home.

A great many specimens are in this way obtained, and much material collected to be separated on rainy days.

We move on now a quarter of a mile to a station with muddy bottom at 25 fathoms, where in a few hauls of black, sticky mud we find numbers of *Leda tenuisulcata*, *Yoldia thraciiformis* and *Yoldia sapotilla*, with quantities of *Astarte undata*, *Cardita borealis*, a few of the *Cardita novangliae*, *Cardium pinnulatum*, *Thracia truncata*, also, of course, great numbers of *Nucula proxima*, *Nucula delphinodontia* and *Nucula tenuis*.

Another haul nearer shore, on harder bottom, brings us *Rissoa carinata* and *Rissoa exarata*. Here also we find the *Chrysodomus decemcostatus*, the *Sipho stimpsonii* and *Sipho pygmaeus*, and a few young *Serripes groenlandicus*, with the pretty zig-zag markings which disappear in the older specimens.

The material is also washed and sifted after being picked over, and with aching backs we rest in the scow as we go ploughing

through the water on the way home. It is by no means easy work hauling the dredge, leaning over the side of the scow to wash the contents of the sieves, and we have narrow escapes from sea-sickness on rough days.

Outside the islands, in deep water, we have dredged the *Dentalium striolatum*, valves of the *Panomya norvegica*, *Mya truncata* and *Liocyma fluctuosa*, and alive the *Menestho albula*, *Admete couthouyi*, *Puncturella noachina*, *Lepeta caeca*, *Modiolaria nigra*, *Modiolaria discors* and *Modiolaria corrugata*, also the *Cardium islandicum*.

On arriving home, the material collected is spread in the sieves to dry in the sun, and we find it difficult to wait until it is dry enough to bring into the work room. It is only by careful picking over that the smaller species are obtained and it is in this way that we get good series of the *Rissoïdæ*. The *Rissoa*, or rather *Cingula castanea*, *Rissoella eburnea*, *Turbonella nivea*, *Turritella acicula*, and *Turritella erosa*, *Molleria costulata*, *Retusa gouldii* and *Retusa petenuis*, and the *Diaphana debilis*.

Many live specimens are put into shallow dishes, and under the microscope it is most interesting to watch the *Margaritas*, *Belas*, *Lunatias* and the active *Yoldias* moving about.

A day's dredging thus means a good deal of work, and after all comes the labelling and putting in the cabinet, last but not least of a day's dredging.

OBSERVATIONS ON THE GENUS QUADRULA.

BY L. S. FRIERSON.

In his admirable Synopsis of the Naiades, Mr. Chas. T. Simpson says (page 766), that although he had examined thousands of animals of the *plicata* group of *Quadrula*, he had never seen but a single one having eggs in the gills, and that other students had found them equally barren. In NAUTILUS (vol. xv, no. 4, p. 39), H. von Ihering speaks of the specimen of *Q. heros* Say, examined by Lea, and of the specimen seen by Sterki, and he seems to be rather doubtful whether *Quadrula* (of this group at all events) *always* carry eggs in all four gills. My observations of late have been singularly lucky in this respect and will, I think, settle this point. The first specimen

found gravid by me (of this group) was a *Q. trapezoides*, May 10, 1901. Since that time I have opened and examined dozens of gravid specimens. They are gravid from May to September, after which I have never found eggs in their gills. Of *Quadrula pèrplicatus* Conrad, I have taken but two specimens, June 7, 1901, and August 19, 1903. In one the gills (all *four*) were but one-half filled with eggs, the *lower half* of each gill being empty. The other was a normal *Quadrula*. *Quadrula heros* had never been taken gravid by me until October 8, 1903, a young specimen proved to be in that condition. Its gills (four) were packed full of uncountable ova. These, under the microscope, were perfectly spherical and undeveloped, showing that they were recently extruded from the ovary.

On November 24, 1903, a batch of about fifty were brought me by a negro, to be sent to Mr. Chas. Conner, of Philadelphia. After packing fifteen or twenty for him, the remainder were opened, and to my surprise, fully half were gravid. Mr. Conner reported several of his also gravid. Most of these eggs were not yet developed into glochidia, several specimens having eggs in the "mulberry stage."

January 7, 1904, out of seven specimens opened, four proved to be gravid. These were full of glochidia, but they did not seem to be perfectly developed or ready to be extruded, being very sluggish.

These observations prove two points: First, that the *plicata* group belongs safely to *Quadrula*, as defined by Mr. Simpson, and that the specimen noted by Sterki and H. von Ihering must have been abnormal. Secondly, that the *seasons* of ovulation are different in different species of the same group, *Q. trapezoides* being a summer breeder, while *Q. heros* is an autumn or winter breeder.

THE MOLLUSKS OF CEDAR LAKE, INDIANA.

BY FRANK COLLINS BAKER.

Some months ago, the Monon Railroad invited the writer to visit Cedar Lake, Indiana, to witness the seining of the lake for "pirate" fish, such as carp, gars and pickerel. Incidentally a collection of the mollusks was made, which seems of more than passing interest. The lake is a body of cold water, of considerable extent and of great depth in places. The species collected are as follows:

Valvata tricarinata Say.

Valvata tricarinata var. *confusa* Walker.

Valvata bicarinata Lea.

Valvata bicarinata var. *normalis* Walker.

A quantitative study of the *Valvatas* collected is very interesting. 275 specimens were collected, of which 117 were typical *tricarinata*, 104 *bicarinata* var. *normalis*, 31 *tricarinata* var. *confusa*, 21 *bicarinata*, 1 specimen was 4-carinate and 1 specimen of *bicarinata* was almost ecarinate.

The most common forms of the carinate *Valvatas* would seem to be *tricarinata* and *bicarinata* var. *normalis*; typical *bicarinata* seeming the rarest.

Amnicola limosa Say. Common.

Amnicola walkeri Pilsbry. A single specimen of this very distinct species was found, but a careful search of the lake would probably reveal a number of specimens. It is one of the most characteristic of the fresh-water mollusks.

Planorbis campanulatus Say. Very common.

Planorbis bicarinatus Say. Common.

Planorbis exacutus Say. Apparently rare, as only two specimens were found.

Planorbis parvus Say. Very common.

Limnæa caperata Say. Fairly common.

Limnæa humilis Say. Not common.

Physa heterostrophæ Say. Not common.

Physa gyrina Say. Not common.

Succinea retusa Lea. Common.

A NEW FLORIDIAN AMNICOLA.

BY H. A. PILSBRY.

Amnicola augustina n. sp.

Shell narrowly umbilicate, brown or olive-brown, smooth, ovate-conic; spire convexly conic, the apex rather obtuse. Whorls $4\frac{3}{4}$, quite convex, separated by deeply-impressed sutures. Aperture about half as long as the shell, broadly ovate, obtusely angular above; peristome acute, continuous, dark-edged, adnate to the preceding

whorl for a short distance above. Operculum as usual in the genus. Length 3.2, diam. 2.2, longest axis of aperture 1.6 mm.

A small stream near St. Augustine, Florida. Types no. 58088, A. N. S. P., collected by Charles W. Johnson.

This species is larger than *A. floridana* Fld., with a longer spire and more obtuse apex. It was collected in some quantity by Mr. Johnson many years ago. It was at first identified as *Bythinella tenuipes* Couper, and so recorded in NAUTILUS iii, p. 137; but further investigation has shown that it belongs to a different group of species.

NOTES ON THE NOMENCLATURE OF THE PUPACEA AND ASSOCIATED FORMS.

BY W. H. DALL.

The publication of Mr. Woodward's list of British land shells and certain work on which I have been engaged, have recently drawn my attention to this subject, which I have found so involved and so imperfectly represented in many publications on the group as to lead me to a tolerably thorough investigation, some of the results of which are here expressed.

I take it as axiomatic that (1) the type of a group must be one of the species mentioned when the name of the group was first published; (2) that in consolidating several old genera one of the old names and not a new one must be employed for the consolidated group; (3) that when a heterogeneous group is subdivided, its name must be retained for one of the resulting subdivisions; and (4) that we are under no obligation to accept the first species of a list as the type of a group for which no type has been selected by the original author, but that we should accept the decision of the first subsequent author who undertakes to select types from the original list in revising it.

In the following notes only the question of nomenclature is considered, the validity of the sections is left to the specialist in this difficult group. In matters of specific synonymy, I have depended on L. Pfeiffer, Pilsbry and Sterki.

Isthmia Gray, 1821. The sole example cited is *Vertigo pygmæa* Drap., which must be regarded as the type. *Staurodon* Lowe, 1852, and *Dexiogyra* Stabile, 1864, are synonymous.

Jaminea Risso, 1826; not Brown, 1827. Brown cites the name as of Bruguiere, but I have found no reference to this origin of it elsewhere. Risso's group is heterogeneous, and was intended for the large Pupae in which the body whorl interrupts the peristome, while for the small species of *Vertigo*, etc., with a continuous peristome, he proposed a genus *Saraphia*, none of the species contained in which can be positively recognized. Risso's first species is *Vertigo minutissima* Hartmann, which should properly have been placed in *Saraphia*. Those which agree more or less with his diagnosis have since been separated into a number of groups in the following order chronologically: *Abida*, *Sphyradium*, *Eucore*, *Torquatella*. There are also three unidentifiable species. Risso's second species was the last to be separated and should have been reserved for *Jaminia*, of which *Torquatella* must be regarded as a synonym. This type is *Turbo muscorum* Linné, not Draparnaud.

Chondrus, Cuvier, 1817, not of Lamouroux, 1813. Cuvier's *Chondrus* was divided into two groups not named and with no type cited. In 1821, Gray cited *Pupa cinerea* Drap., as an example, but Cuvier's name is pre-occupied in Polyps. The next name for this group is *Torquilla* Studer, 1820, type *P. secale* Drap. *Torquilla* had been used by Brisson in 1760 for a bird. Now Brisson is a non-binominal writer and his genera have only been adopted by an arbitrary over-riding of the rules of nomenclature. Nevertheless I am inclined to believe that such arbitrary acts are sometimes beneficial to science and to be praised rather than blamed, when the occasion is suitable, and the consensus of opinion of the specialists in the department affected, practically unanimous. Rejecting *Torquilla*, the next name in order is *Abida* Leach, in Turton, 1831, sole example cited *P. secale*, which must be regarded as the type. Several other names have been proposed to take the place of *Chondrus* by too hasty writers, such are *Granaria* Held, 1837, *Pupella* Swainson, 1840, *Chondrina* Reichenbach, 1847; while further subdivisions of the type are *Sandahlia* and *Granopupa* Westerlund, 1887.

Alæa Jeffreys, 1830. This heterogeneous group, beside species of *Isthmia* and *Jaminia*, contained originally *Pupa edentula* Drap., afterward separated as *Sphyradium* and *Pupa minutissima* Hartmann, which must be taken as the type.

Pupilla Leach, in Turton, 1831. Two species are cited, one being already the type of *Jaminia*, the other, namely, *P. umbilicata* Drap.,

necessarily becomes the type of *Pupilla*. *Gastrodon* Lowe, 1852, not of Rafinesque, 1815, and *Reinhardtia* Boettger, 1878, are synonymous. *Lauria* Gray, 1840, was proposed for *P. umbilicata* and *P. anglica* Fér.; if *Lauria* is retained at all it must be for the latter, in which case *Leiostylia* Lowe, 1854, is synonymous.

Eucore Agassiz, in Charpentier, 1837, was proposed for *P. tridens* and *P. quadridens* Drap. *Gonodon* Held, Dec., 1837, *Chondrula* Beck, 1838, and *Chondrulus* Westerlund, 1890, appear to be synonymous.

Sphyradium Agassiz, 1837, has been adopted for *P. edentula* Drap., by the process of elimination; *Paludinella* Lowe, 1852, not of Pfeiffer, 1841; *Edentulina* Clessin, 1876, not of Pfeiffer, 1855; and *Columella* Westerlund, 1876, are synonymous. *Sphyradium* (*ferrari*) Hartmann, 1840, has been named *Coryna* by Westerlund, 1887. *Sphyradium* Martens, in Albers, 1860, is a synonym of *Orcula* Held.

Faula H. and A. Adams, 1855, not of Blanchard, 1850, was renamed *Fauxulus* by Schaufuss in 1869. *P. capensis* Kurr, appears to be the type.

Ptychochilus Boettger, 1880, founded on *Pupa tantilla* Gould, seems to have priority over *Nesopupa* Pilsbry, 1900. *Bifidaria* Sterki, in Pilsbry, 1891, contained two species, *P. contracta* Say and *P. servilis* Gould. *P. contracta* being taken as type by Sterki in 1892, for his section *Albinula*, *P. servilis* must be considered the type of *Bifidaria* s. s., and not *P. hordacea*, for which Sterki's *Eubifidaria*, 1893, will stand, if the sections are valid otherwise.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota chishimana n. sp.

Shell umbilicate, depressed globose, with conic spire, rather thin, pale yellow, becoming white on the spire, the last whorl encircled by three bands, that at the periphery dark chestnut and sharply defined, the others much paler, reddish-brown, and indistinctly defined, one in the middle of the base, the other on the upper surface, ascending the spire midway between sutures on the penult. whorl, or obsolete except on the last whorl. There are also one or two dark

oblique streaks indicating places of growth-arrest. Sculpture of irregular, rough and coarse wrinkles in the direction of growth lines, and under the lens, irregular fine spiral lines are seen. The spire is much smoother than the last whorl. Whorls about 6, moderately convex, regularly increasing, the last rounded peripherally, not descending in front. Aperture not very oblique, lunate, white and conspicuously banded within. Lip broadly reflexed, strengthened by a narrow callous ridge within, the face flat or concave, the thin outer portion dark flesh colored, the ridge lighter or white. The peripheral band extends to the lip-edge.

Alt. 20.5, diam. 26.5 mm.

Alt. 19.5, diam. 25 mm.

Kunashiri Island, in the Chishima (Kuril) chain. Types no. 86324 A. N. S. P., from no. 1153 of Mr. Hirase's collection.

This fine *Euhadra*, of a type unknown in the main island of Japan, is the first to be reported from the Kuril chain. Other land shells from Kunashiri will be described in a future communication.

Vitrea radiatula var. *radiata* n. var.

This variety is smaller than *radiatula*, and of a pale reddish-brown tint, not greenish. It is decidedly larger than *V. radiatella* (Reinh.), and less depressed. Alt. 2, diam. 4 mm.

Tōya, Kuziro, in eastern Yesso (Hokkaido). Types no. 85788 A. N. S. P., from no. 1147 of Mr. Hirase's collection.

Alycæus awaensis n. sp.

This shell is larger and more elevated than *A. reinhardti*, pale brown. Sculptured with spaced riblets, which on the swollen last half whorl became fine and densely crowded. The neck is moderately contracted and smooth. The aperture is circular, lip thin, narrowly reflexed. There are sometimes some spiral striæ on the spire, not visible in all specimens. Alt. 3.8, diam. 2.6 mm.

Hiyama, Awa, Island of Shikoku. Types no. 84958 A. N. S. P., from no. 1083 of Mr. Hirase's collection.

Succinea ikiana n. sp.

A species of the *S. avara* group, but more solid than that species and of a bright amber color. Whorls 3, very convex and parted by deep sutures. Sculpture of irregular, coarse wrinkles. Aperture ovate, the upper insertion of the outer lip arcuate.

Length 8.5, diam. 5, length of aperture 5 mm.

Length 7, diam. 3.6, length of aperture 4 mm.

Wataramura, Iki. Types no. 85747 A. N. S. P., from no. 1148 of Mr. Hirase's collection.

Vertigo japonica n. sp.

Shell minute, oblong, about equally obtuse at both ends; brown, nearly smooth. Whorls 5, parted by deep sutures, the last whorl tapering downwards, impressed by a deep furrow terminating above the middle of the outer lip. Aperture irregularly ovate, contracted by four teeth: a long parietal lamella, a strong columellar lamella and two short, deeply-placed palatal plicæ. Peristome thin, very narrowly expanded, the outer lip projecting forward and bent inward at the upper third, at the termination of the external furrow. Alt. 1.7, diam. 1 mm.

Ikusagawa, Ojima. Types no. 85746 A. N. S. P., from no. 1143 of Mr. Hirase's collection.

This species from southern Yesso is related to *V. hirasei* from Kyūshū, but differs from that species in having much larger teeth. Both belong to a group of Vertigines which lives throughout the whole northern part of the Holarctic region.

Nesopupa tamagonari n. sp.

Shell extremely short and broad, very obtuse at both ends, chestnut-brown, nearly smooth, somewhat glossy. Whorls $4\frac{1}{2}$, rapidly increasing, parted by slightly-impressed sutures; the last whorl forming more than half the length of the shell, tapering downwards, bearing a strong crest or ridge close behind the outer lip. Aperture small, squarish-oval, obstructed by six teeth: a long, entering parietal and a much shorter angular lamella; a deeply-placed columellar lamella; a small, tubercular basal plica, and two short but high lamellar palatal plicæ. Alt. 1.3, diam. 1 mm.

Chichijima, Ogasawara. Types no. 85745 A. N. S. P., from no. 855a of Mr. Hirase's collection.

A peculiar, almost globular *Nesopupa*, related to *N. dedecora*, but shorter, with a weaker crest, which is nearer to the lip. (*Tamagonari*, egg-shaped.)

This is the second Ogasawaran species of a Polynesian genus, discovered by Mr. Hirase's collectors. These little strangers are per-

haps the only exclusively Polynesian element in the snail fauna of the Bonin Islands. *Tornatellina* also is doubtless a group of Polynesian origin, though in the ages of its existence it has spread to the borders of the Pacific, from New Zealand to the Japanese islands.

Carychium pessimum var. *borealis* n. var.

Differs from *C. pessimum* in being smaller and less conic, more of an oblong shape. Harutori, Hokkaido. Types no. 85772 A. N. S. P., from no. 1144 of Mr. Hirase's collection.

LE PERE LAMBERT, S. M.

BY CHARLES HEDLEY.

Half a century ago, a little band of Marist missionaries landed in New Caledonia to convert to their faith the cannibal savages of that island. For years, lance or casse-tête daily threatened them with cruel death. They knew no society but the disgusting companionship of brutal savages. From the danger, hardships and squalor of their life, these cultured gentlemen turned for relaxation to the pleasant paths of science. To them we owe most of our knowledge of the fauna, flora, geology and ethnology of New Caledonia. One by one, Montrouzier, Thomassin, Rougeyron—this noble company of hero, pauper, saint and savant—have gone to their rest. The last patriarch, Father Pierre Lambert, died in Noumea, on November 3, 1903, aged 82 years.

He wrote a few short papers in the *Journal de Conchyliologie*, but he will be chiefly remembered as a collector. One of the finest of the cones bears his name, as does one of the largest *Placostylus*. Souverbie dedicated to him species of *Pecten*, *Melanopsis*, *Trochus*, *Euchelus*, *Xenophora*, *Mitra*, *Cancellaria*, *Pleurotoma*, *Rissoina* and *Eulima*, also the genus *Lambertia*.

Pere Lambert published a memoir on Ethnology—*Moeurs et Superstitions des Néo-Calédoniens*, Noumea, 1900, pp. vi, 360, with 60 illustrations. An important but little known book.

GENERAL NOTES.

ANCYLI ADHERING TO WATER BEETLES.—Two interesting examples of *Ancyli* attached to the elytra of water beetles, recently came under my observation through the kindness of Mr. Albert P. Morse, who collected them at Wellesley, Mass. One a *Dinutes* (whirligig beetle), collected April 26, 1900, has an *Ancylus fuscus* Adams, 4×2.5 mm., situated dorsally and extending about equally over each elytron; whether it adhered with sufficient strength to prevent the beetle flying, can only be surmised. The habit of *Dinutes* in gyrating on the surface of the water, often in the bright sun-light for hours at a time, is not strictly conducive to the life of an *Ancylus* thus situated, for it would be entirely out of water while the beetle was on the surface, although during the early spring the beetle probably spent most of its time beneath the water.

The other, a *Dytiscus*, collected in October, 1898, carried an *Ancylus parallelus* Hald., 5×2.5 mm., near the end of the left elytron. Both cases present an interesting factor in the distribution of species, which probably in many instances accounts for the sudden appearance of mollusks in small, artificial ponds.—C. W. JOHNSON.

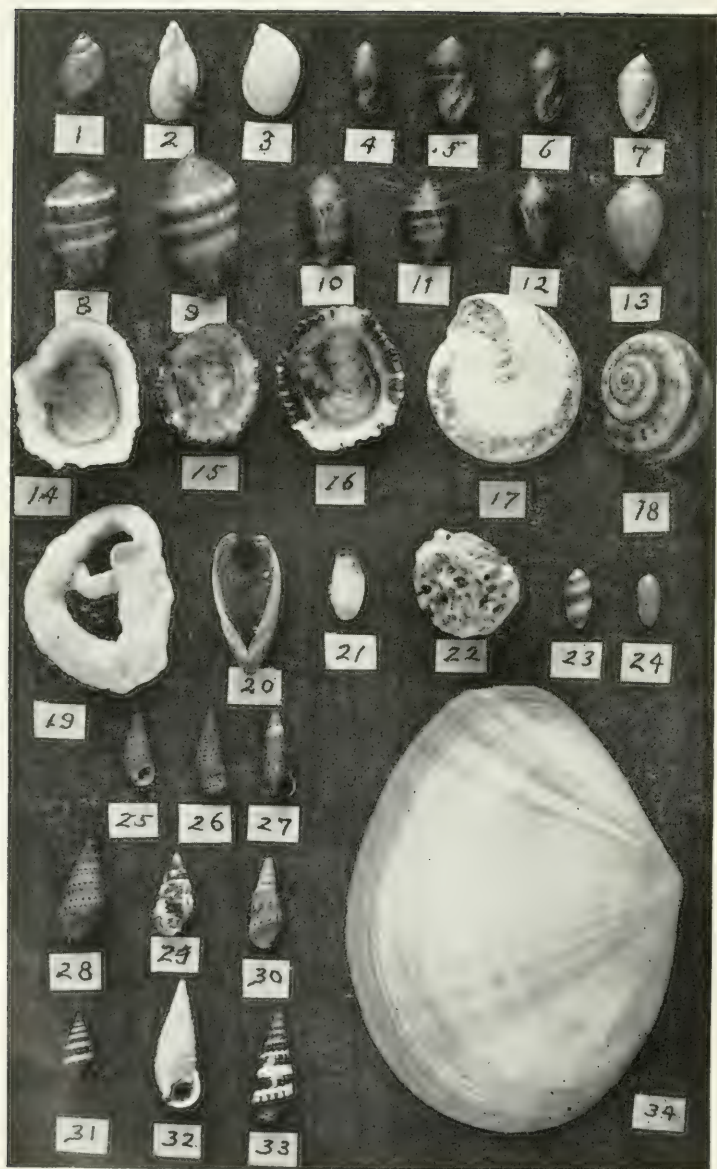
CLAM-OROUS CROWS.—The following newspaper clipping, if true, shows that the amiable, inoffensive clams of the Northwest coast are having a hard time of it, and are entitled to the sympathy of all conchologists without distinction of age, sex or color:

"Scare-crows are now placed upon slate roofs in Victoria, B. C. The crows, which swarm on the beach and dig for clams, fly over the buildings and drop the clams on the roof, by this means breaking the shells and leaving the meat free to be eaten. In many cases, when the clams were dropped, the slate would be broken."

Such conduct on the part of the crows is certainly discreditable; they should be placed on the black-list.

Ill fare the clams to hungry crows a prey,
And brought to grief in such a crow-ill way.

The clam is probably *Saxidomus giganteus* Desh., quite common in the Vancouver region and the principal edible clam of both "Injuns" and white folks thereabout, and solid enough to break roof slates if not political ones, when dropped from a considerable elevation. *S. giganteus* is abundant between ordinary tide marks; it is great in soup; an excellent clam.—ROBT. E. C. STEARNS, *Los Angeles, Cal.*



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HELIX HORTENSIS IN NEW ENGLAND.

BY REV. HENRY W. WINKLEY.

The following is a suggestion. I cannot say that I am convinced that it is a proof, but I offer these thoughts for what they are worth. We must associate *H. hortensis* with northern European forms rather than with the American land shells. Its distribution in New England is most singular, limited as it is to widely separated spots, mostly small islands of the east coast. It certainly cannot have had the same migration as *Polygyra* or *Pyramidula* or it would be distributed as they are. Undoubtedly at the close of the glacial period, the American types worked north and east into New England; but *H. hortensis* was not one of them. That it came from Europe is evident. Commerce-voyages of Norsemen or other explorers have been suggested. This theory becomes absurd when one examines the localities where *H. hortensis* lives. These places are not ports and never have been. Some of them are the last places a man would land, not the first. Let us now ask the question of an earlier migration. Circumpolar species exist. Other forms common to Europe and America would make an interesting study. That there was a pre-glacial period when forms migrated around the northern regions is a settled fact. Did *H. hortensis* come then and survive? The writer has been much interested in the glacial theory, and has done some field work on the New England area. That the glacier covered all of New England is an accepted fact, but when we say all, is there not a chance for exceptions. Along the southern coast we may point

to Long Island as a terminus. The sound is not deep and tides not great, this barrier would be and was crossed. The eastern coast is different. The trend of the ice, though slightly deflected towards the east, was in a southerly direction; comparatively little passed off the east coast. Add now a study of Greenland, as it is under continental glaciation conditions and probably exactly as New England was. Peary's exploration shows a range of animals like the musk-ox, arctic wolf and others at Independence Bay, and practically the extreme northern limit of Greenland, and this implies food on which they live. In other words, Greenland under a glacier yet has a shore line of animal and vegetable life. The distribution of *H. hortensis* fits the theory that it is a survivor. The present abodes are such that it could not have been carried from one to the other and not have found a home on the mainland more than it has. On the other hand Grand Manan, outer islands in Casco Bay, the extremity of Cape Ann and Cape Cod, are places that would be last resorts. A more exhaustive treatment of the subject would deal with elevation and subsidence, possible islands or land in the east now submerged. The stronger tides that would break up a mass of ice extending seaward. I leave these topics and present only the simple suggestion.

A NEW SPECIES OF PERIPLOMA FROM CALIFORNIA.

BY WILLIAM HEALEY DALL.

Periploma sulcata n. s.

Shell rotund, white, with the left valve flatter, thin, sculptured with numerous, close-set, irregularly concentric, more or less interrupted, low ridges, separated by subequal shallow interspaces; the surface is also microscopically shagreened, and there is a low rib extending from the beak to the lower margin of the ill-defined rostrum and an ill-defined furrow radiating from the beak toward the anterior base, in the right valve; beaks low, distinctly fissured; anterior dorsal hingeline rounded, posterior ditto, shorter, nearly rectilinear, forming with the elevated rib a subtriangular space which is free from the undulations which cover the rest of the shell; interior shining, hardly nacreous, the muscular impressions very small, the pallial line obscure; chondrophores prominent, spoon-shaped, extend-

ing obliquely forward, and with their connecting resilium sustaining a proportionately large triangular lithodesma; the chondrophores are supported behind by well-developed clavicular props, which are inserted posteriorly on the surface of the valve below the linear hingeline. Length 32, height 27, diameter of right valve 6 and of the left valve 4 mm.

This elegant shell, in a somewhat damaged condition, was thrown upon the beach at San Pedro, Cal., after one of the heavy winter storms and collected by Mrs. T. S. Oldroyd, to whom we owe so many additions to the fauna of this region.

This species is, we believe, the first *Periploma* known to possess an undulated sculpture, and bears to those of the ordinary type such a relation as that of *Cyathodonta* to *Thracia* or *Labiosa* to *Raeta*. The differences of sculpture and in the form of the lithodesma suggest that, as in the case above cited, *P. sulcata* is entitled to a sectional name for which *Halistrepta* is proposed.

A NEW DENTALIUM FROM CALIFORNIA.

BY WILLIAM J. RAYMOND.

Dentalium vallicolens n. sp.

Adult shell large, rather slender, moderately curved posteriorly, the latter half nearly straight; cream-white, often yellowish toward the mouth, shining where not eroded, earlier portion usually dull and chalky because of erosion; growth-lines fine, irregular, distinct, rarely an encircling groove due to repaired fracture; at the apex there are longitudinal, low, rounded, inconspicuous threads, of which seven or eight are more prominent and three to six in each interspace are less prominent; these die out, and fine, superficial striae appear, visible under the glass and continued to the mouth of the shell, seven or eight per millimeter of circumference; aperture simple, circular, mouth slightly oblique.

Two specimens measure: length 64.5, diam. of aperture 5.3, of apex 1.5, at middle 4.6, height of arch from chord 2.5 mm.; length 64.0, diam. of aperture 4.7, of apex 1.4, at middle 4.2, height of arch from chord 3.0 mm.

Young shell strongly curved, very slender for the first eight or ten millimeters of length, then rapidly enlarging; at first seven or

eight angled, the angles defined by sharp ribs with channeled interspaces, then passing into the sculpture of the adult by successive interpolations of secondary riblets, while the primary ribs lose in prominence and the section of the shell becomes circular.

Length 16.7, diam. of aperture 2.0, of apex 0.3, at middle 0.1, height of arch from chord 1.8 mm.

University of California Marine Biological Laboratory: Station 12, Vincente (or Redondo) Submerged Valley, Santa Monica Bay, 145 fathoms, temp. 45.5° F., bottom sand and mud; also scattering specimens from station 14 off Point Fermin, 100 fathoms, temp. 46° ; station 70, La Jolla Submerged Valley, between 117 and 54 fathoms; station 79, off San Diego, 64 fathoms.

The Vincente submerged valley where this species was found in considerable numbers, is one of a series of such valleys described and mapped by Prof. George Davidson, of the University of California, in Proc. Cal. Acad. Sci., 3 Ser. Geology, Vol. 1, No. 2. Opposite Redondo the 100-fathom line marks the edge of a gently sloping, submarine plateau which extends seaward about seven miles. Outside of this plateau the bottom descends much more abruptly. The Vincente valley is nearly 300 fathoms deep and about one and one-half miles wide where it breaks through the edge of the plateau. It carries a depth of 100 fathoms to within one and one-half miles of the beach, thus bringing the colder water of greater depths, with its accompanying fauna, close inshore. It is probable that the *Dentalium* here described will be found in deeper water as marine exploration proceeds along the coast of southern California.

The sculpture of this fine, large species recalls *D. ceratum* Dall (Florida, Cuba, Barbados), but the former is larger, the adult shell is proportionately wider, the young is more attenuated at the apex, and the superficial striae are continued to the mouth, even on the largest specimens. At the length of Dall's species, *D. vallicolens* is more than twice as wide. The peculiar sculpture of the earlier portion and the striation of the latter, readily separate the present species from *D. pretiosum* and *D. indianorum*, even if the angled apex be lost, as is almost invariably the case in the adult. Erosion has in some specimens proceeded so far that patches only of the outer layer of shell are left. In others it seems to have attacked the shell beneath the outer layer so that longitudinal lines and encircling rings of opaque white appear beneath the outer, shining layer which then begins to scale off.

NOTES ON THE MOLLUSCA OF THE BERMUDA ISLANDS.

BY C. ABBOTT DAVIS, S. B.

Last July and August were profitably spent in collecting insects and mollusks among the three hundred beautiful islands now called the Bermudas. Like the Hawaiian group, they are chiefly interesting because of their isolated geographical position, being nearly 700 miles distant from any other land. Commerce, however, is rapidly changing the fauna and flora of Bermuda to such an extent that old records, *i. e.*, records of twenty years standing, are obsolete or unreliable. Large quantities of West Indian shells are constantly being brought to the island to sell to the unsophisticated traveller, and some of the stores actually sell these shells as Bermudian. Even the native colored boys are anxious to sell shells for "tuppence," and they are not particular about the historical side, so that one has to beware of all shells not collected *in situ*.

The expeditions of Prof. Helprin in the summer of 1888, and of Prof. Verrill in the spring of 1898 and of 1901, form the nucleus of most of the authentic published data. I had planned a trip to Bermuda for July and August 1903, but upon learning of the Bristol-Mark expedition, I decided to go with them, and the following notes are a part of the records of our trip.

In 1900, Dr. Pilsbry revised the "Air-breathing Mollusks of the Bermudas," and my research differs little except in minor details. For instance, he agrees with Mr. Smith that *Succinea bermudensis* Pfr., is *S. barbadensis* Guild., but states that the animals need a careful study. I agree with the latter statement and as proof of it illustrate three Bermudian forms. Fig. 1 is the common form, Fig. 2 was occasionally taken at Flatts, Fig. 3 is the fossil variety.

Physa acuta Drap., has not been recorded since G. Brown Goodes' record of 1888. We took it from rain-water tanks in Devonshire Swamp.

The variety *pulchella* Pfr., of *Truncatella caribæensis* Sowb., is always found *dead*. This, taken with the fact that this mollusk lives at the high-tide mark, and is therefore apt to be water-worn, makes *pulchella* simply a worn *caribæensis*.

In a lot of several hundred *caribæensis* received recently from the West Indies, there is a complete series showing the wear on these

shells, even to fresh transparent specimens. Prof. Verrill has lately added the following to Dr. Pilsbry's list:

Blautneria heteroclita Montg., *Hyalina lucida* Drap.

Pæcloronites zonata Verr. (Fig. 17), *Siphonaria henica* Verr.

My records add the following:

Carychium exiguum Say. (var.). Sub-fossil.

Vitrea cellaria Müll. Several at Hamilton.

Helix pisana Müll. Several at St. Georges (Fig. 18).

Planorbis dilatatus Gld. Dev. Swamps, (Brackish water).

Paludestrina tenuipes Cooper (var.). Eve's Pond.

The beautiful genus *Melampus* needs revision, and as I collected (personally) several quarts of these bewildering shells, I will attempt the following key to the Bermudian forms:

- A. Aperture narrow and short, shells small, pointed at both ends, greasy, brownish or blackish, no teeth (see Fig. 4).

M. bulloides Mont.

- B. Aperture wider and longer, at the extreme base a very prominent fold, shells larger, apex pointed, greasy, color brownish or purplish, with one or more revolving white or yellowish bands, row of teeth within the outer lip very numerous, (Fig. 5).

M. flavus Gmel.

1. Color plain brown or purple, no stripes, (Fig. 6).

Var. *purpureus* n. v.

2. Size and shape same as *purpureus*, immaculate white when alive, rare, found only at Hungry Bay, (Fig. 7).

Var. *albus* n. v.

- C. Aperture still wider, shell wide at the top, apex abrupt, two or more well developed teeth on the inner lip, often attaining to double the size of *flavus*, not green, (Fig. 8 is the Florida form).

M. coffeus Linn.

1. Larger, and apex more pointed than in *coffeus*, the row of teeth in outer lip very irregular and uneven, banded spirally, with brown and white, width of bands *very irregular*, (Fig. 9).

Var. *gundlachi*, Pfr.

2. Pilsbry says: "Scarcely if at all to be distinguished from the prior *M. gundlachi* Pfr., but not attaining so large a size." These are probably the juvenile *gundlachi*, the lack of color and lustre in the large ones being due to longer exposure and yet they look like another variety so the smaller ones are called (Fig. 10). Var. *redfieldi*, Pfr.

3. Size and shape same, but the revolving bands of light and dark color *alternate evenly*, (Fig. 11).

Var. *alternatus* n. v.

4. Smaller, darker, polished, beautifully mottled with more or less prominent *vertical* stripes, (Fig. 12).

Var. *verticalis* n. v.

5. Stout, *plain brown* form, with no markings whatever. (Fig. 13).

Var. *bishopii* n. v.

Named in honor of mine host Mr. Geo. A. Bishop, Supt. of Public Gardens, Hamilton, Bermuda.

As to *Siphonaria*, Verrill has described in the "Transactions of the Conn. Academy of Science," a species called *S. henica*. So far as is known, only one specimen—the type—is in existence. This was taken at Bailey Bay on the north shore. We collected over three pints of *S. alternata* Say, and found many of the var. *brunnea* Hanley, also two others.

2. Shell small (size 16×13 mm.), blackish, opaque *opalescent*, rare, Hungry Bay, south shore (Fig. 15). Var. *opalescens* n. v.

3. *Intermediate* in size and coloration between *brunnea* and *opalescens*. Very thin, translucent, always distinguished by radial black lines from apex to margin, covering the whole or a part of the inner surface. Common on the south shore at high-tide mark (Fig. 16).

Var. *intermedia* n. v.

There are undoubtedly many marine species which might be added to the published lists of Dall, Heilprin, Verrill, and others; but the great difficulty just now is to eliminate equivalent nomenclature. I have not seen records of the following species taken by us in Bermuda:

Acmæa punctulata Gmel.

Ocenebra intermedia Ads.

Anachis catenata Sowb.

Nassa consensa Rav.

Alabina adamsii Dall.

Natica livida Pfr.

Asaphis deflorata Linn.

Nitidella cribraria Linn.

Bittium varium Pfr.

Olivella rosalina Ducl.

Chione beau Recl.

Ostrea folium Linn.

Chione pygmæa Lam.

Pecten ornatus Lam.

Coralliophila abbreviata Lam.

Pitaria fulminata Mke.

Cypræacardia hornbeckiana

Purpura undata Lam.

Mörch.

Rissoina pulchra Ads.

Cythara simulata Rve.

Semela proficua Pult.

Eulima gracilis Ads.*Spirula australis* Lam.*Gastrochæna ovata* Sby.*Tellina promera* Dall.

(Fig. 20.)

Tellina sybaritica Dall.*Litiopa bombyx* Kein.

Vermetus erectus Dall. This shell is quite common, but generally has the erect portion broken off, as in Fig. 19.

The following are undoubtedly new forms. Cotypes of each are deposited (with the *Melampus* and *Siphonaria*) in the museums at Washington, Philadelphia, Boston and Providence.

Gastrochæna mowbrayi sp. n. (Fig. 21).

This has often been mistaken for a juvenile *G. ovata*, (Fig. 20) as it resembles *ovata* in shape and color, but neither in size, nor habitat. In Bermuda *G. ovata* has an alt. of 20 mm. and bores a hole about 10 mm. in diameter in the solid brain-corals, or shell-rock.

On the other hand, *G. mowbrayi* is found in the dead or dying stems of the branch coral (*Oculina*) the entire stem of which could be put into a tube of *ovata*. *G. mowbrayi* occupies a cavity a little larger than the shell (which is about 6 x 3 mm., the cut showing an extremely large specimen) with a small opening to the outer surface of the coral. These shells are often grouped so closely together, as to undermine the strength of the coral, (see Fig. 22). Locality, Harrington Sound, dredged in 20 to 40 ft. Named in honor of Mr. Lewis Mowbray an enthusiastic Bermudian naturalist.

Tellina lævigata Linn., var. *stella* n. v.

T. lævigata is called the "sunset shell" by the natives, and it well deserves the name on account of its beautiful bands of orange or pink alternating with delicate yellow tints. About one out of twenty of these shells has diverging, radial pink rays (like *T. radiata*). For this nameless variety I propose the name *stella* (Fig. 34) collected at Flatt's Inlet.

Volvaria avena Lam., var. *southwicki* n. v.

Volvaria avena (Fig. 23) is common along the north shore of Bermuda, and is widely known and easily recognized by its conspicuous transverse orange bands, size 9 x 3 mm.

On Hamilton Beach I found a smaller constant variety (Fig. 24) which had a uniformly dark, mottled ground with no bands of color. Alt. 6 x 2 mm. This variety is named after my friend, Mr. Jas.

M. Southwick, Curator of the Roger Williams' Park Museum, Providence, R. I.

Key to the Bermudian Species of the Genus Cerithium.

The species of this genus were the hardest to revise owing to the fact that the descriptions being brief and often inaccurately figured, no two museums have them named alike. A generous use of the microscope is necessary to distinguish species, and while there are undoubtedly intergrades, the majority are I think, distinct species and not varieties. They are so dissimilar that they can be readily separated. Most of the species may be picked up in Bermuda by the thousand. I brought home at least a half bushel for study.

- A. Very small, jet-black inside and out, often decollate, nodules in *vertical rows of three dashes*. Bermuda form, Fig. 25; Haiti form, Fig. 26; white-tipped Florida form, Fig. 27.

C. minimum Gmel.

- B. Larger, stouter, plain black or dirty brown inside and out, spirals very uneven, nodules in vertical rows of *three dots* (Fig. 28).

C. nigrescens Mke.

- C. Shell stout, spirals uneven, *handsomely variegated* black and white or yellow and white, nodules in vertical rows of three dots (Fig. 29).

C. variabile Ads.

Note.—This shell has been called *eriense* Val., and even placed as a variety of *ferrugineum* Say, which it does not resemble in the least. (See the original figure and description of *ferrugineum* by Say.)

- D. Long, narrow, yellowish-brown, spirals very irregular, three vertical nodules united, forming vertical ribs, by far the rarest form in Bermuda (Fig. 30).

C. ferrugineum Say.

- E. Long, narrow, apex sharp, black with a white revolving band below the suture, the black band contains dashes and the white band dots, spirals regular, blackish inside (Fig. 31).

C. septenstriatum Say.

- F. Larger than any of the above, spirals regular. A whitish calcareous deposit distinguishes this shell (Fig. 32). When this covering is removed by acid or wear as in Fig. 33, it reveals a brownish interior with white bands on which the nodules are shaped like an exclamation point (!), the two upper dots being united. The apex is always very sharp.

C. albocoopertum sp. n.

Any other Bermudian records would be gratefully received by the writer, as he has in press a "Check-List of the Bermudian Mollusca."

GENERAL NOTES.

MOLLUSCA ON PIKE'S PEAK COLORADO.—Last fall I collected *Pupa muscorum* (L.), *Vallonia cyclophorella* Ancey, *Euconulus fulvus* (Müll.) and *Zonitoides arboreus* (Say) by the printing office on Pike's Peak, 10,000 ft. alt. I put them on record because of the altitude; the dominant vegetation of the place consists of *Achillea*, *Dasiphora*, *Fragaria*, *Salix*, *Rosa*, *Populus tremuloides*, *Carduus*, *Geranium*, *Epilobium*, *Delphinium*, *Arctostaphylos uva-ursi*, *Campanula*, *Potentilla*, *Allium*, *Pedicularis*, *Gentiana*, *Picea*, *Pinus*, *Juniperus*, *Antennaria*, *Artemisia*, *Pentstemon*, *Machaeranthera*, *Rudbeckia*, *Frasera* and *Calochortus*: nearly all circumpolar genera, it will be observed, the last five only being exclusively American. I have a note that I found also *Succinea avara*, but kept no specimens.—T. D. A. COCKERELL.

CHIONE CANCELLATA LINN. IN THE JERSEY CITY MARKET.—A strange shell in the market always interests the conchologist. A short time ago my brother gave me a *Chione cancellata* which he had found with some clams (*Venus mercenaria*) purchased of Mr. Brittain, a fish dealer on Bergen ave., Jersey City, N. J. He said there were several in the basket from which the clams were taken. Desirous of knowing whence they came, I inquired of Mr. Brittain where the clams were gathered and he said he believed they came from North Carolina.—SLOMAN ROUS.

THE MOLLUSCAN FAUNA OF ONE LOG.—On October 15th, I collected from the under side of an old log, 12 inches in diameter and 9 feet long, in the vicinity of Des Moines, Iowa, 634 living specimens of the following species:

- Polygyra albolabris* Say, 1.
- Polygyra appressa* Say, 140.
- Zonitoides arboreus* Say, 244.
- Zonitoides minusculus* Binn., 69.
- Conulus fulvus* Müll., 12.
- Succinea avara* Say, 5.

Corychium exiguum Say, 4.

Bifidaria pentodon Say, 1.

Bifidaria armifera Say, 143.

Strobilops labyrinthica Say, 3.

Agriolimax campestris Binn., 12.

Many other logs yielded abundantly of the same and other species.
—T. VAN HYNING.

MR. JAS. H. FERRISS is collecting shells and ferns in Arizona. He reports great success, and the specimens sent in give evidence that he has not lost the knack of finding the finest kinds of snails. There are several forms of *Sonorella*, *Ashmunella chiricahuana* and some new forms of the *levettei* type, two new species of *Oreohelix*,¹ one of them ornamented with whorls of hairs, besides the "small stuff."—H. A. PILSBRY.

VERTIGO ANDRUSIANA Pils. when fully adult has two teeth on the parietal margin, at least in some specimens, and a very minute tooth above the upper palatal plica. Until nearly adult, the basal fold is not developed.—H. A. P.

HELICOGONA ARBUSTORUM IN NEWFOUNDLAND.—Adult living specimens of this common British and European land snail were collected by Dr. Robert Bell in the middle of July, 1885, on grassy slopes facing the sea, near the narrows of St. John's Harbor, Newfoundland. So far as the writer is aware, this is the first time that this species has been found, in a living state, on the American side of the Atlantic. Dr. Bell says that many wrecks of vessels take place on this part of the coast, and that a little farther to the south of the locality where these snails were found, there is a small patch where the common heather (*Calluna vulgaris*) grows. This marks the spot, he adds, where an emigrant ship was stranded, and the beds of the emigrants, which were stuffed with heather, were taken ashore and emptied out.—J. F. WHITEAVES, in *The Ottawa Naturalist*, vol. xvii, no. 11, p. 192, Feb., 1904.

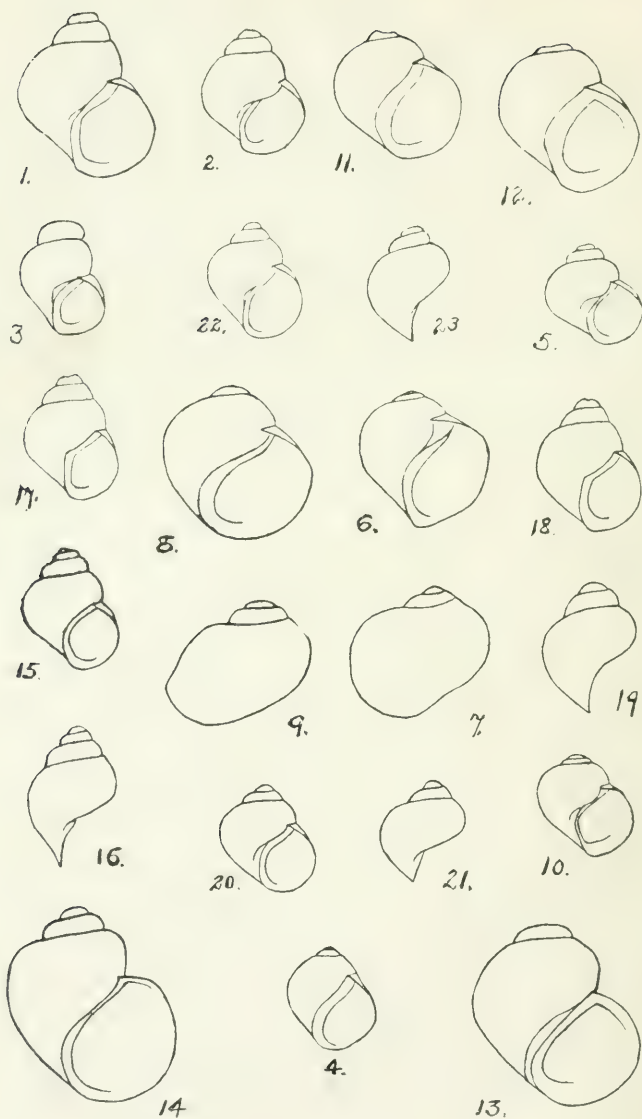
¹ *Oreohelix* is a new genus for the Rocky Mountain Helices of the *H. strigosa* group, hitherto wrongly placed in "*Patula*" or *Pyramidula*, from which they differ by the lack of pedal furrows.—H. A. P.

PUBLICATIONS RECEIVED.

SCIENTIFIC RESULTS OF THE TRAWLING EXPEDITION OF H. M. C. S. THETIS, MOLLUSCA Pt. II, SCAPHOPODA AND GASTROPODA.—By Charles Hedley (Memoirs Australian Mus. IV, pp. 327–402, plates 36–38). This interesting and valuable paper contains the descriptions of 37 new species and three new genera: *Epigrus*, *Myxa*, and *Fascinus*. The new forms together with many others are illustrated by 52 excellent figures in the text. The author has adopted *Calcar* Montfort, 1810, in place of *Astralium* Link, with the following note: “It is obvious that *Astralium* Link cannot honestly be said to have been published in 1807. Probably as a published name *Astralium* should date from Herrmannsen’s article in the Proceedings of the Zoölogical Society of London for 1851, p. 231. Unless the rules of the zoölogical nomenclature are to be broken, *Calcar* must be used instead of *Astralium*. *Cassidea* Brug. 1789 is used in place of *Semicassis* (Klein 1753, pre-Linnean) Mörch 1852.—C. W. J.

DIAGNOSES OF NEW SPECIES OF MOLLUSKS FROM THE SANTA BARBARA CHANNEL, CALIFORNIA. By William Healey Dall (Proc. Biol. Soc., Wash., Dec. 13, 1903, pp. 171–176).

In this interesting paper Dr. Dall describes ten new west-coast species. Of this number all, excepting *Mitra dolorosa* from the Gulf of California, were dredged at Santa Catalina Island during the summer of 1903, by Messrs. Lowe and Paine. One genus, *Macromphalina*, is new to the west coast. New species are: *Actæon* (*Rictaxis*) *painei*, *Clathurella lowei*, *Mangelia fancheræ*, *Mitra lowei*, *Mitra dolorosa*, *Murex* (*Ocenebra*?) *painei*, *Lunatia draconis*, *Macromphalina californica*, *Scala sawinæ* and *Ischnochiton biarcuatus*. As will be seen by the feminine endings two species are named for ladies. Besides the species from the Gulf of California, *Lunatia draconis* has been dredged at Drake’s Bay, Monterey and the Farallones Islands. Of the specific name *draconis* Dr. Dall says: “As Drake was long known to the Spaniards as ‘El Drako,’ I have named the species *draconis* in his honor.” *Scala sawinæ* has been dredged off the Coronada Islands, Avalon and at the Isthmus. The type is from the harbor side of the isthmus at Santa Catalina and was dredged by Dr. Dall in 1873. With these exceptions all the species were dredged off Avalon. Another new species of a genus not before known to inhabit the west coast was described by Dr. Dall in THE NAUTILUS, Sept., 1903, under the title, “A New Species of Metzgeria.” This species collected by J. H. Paine, Dr. Dall named *Metzgeria californica*.—Mrs. M. Burton Williamson,



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NEW SPECIES OF SOMATOGYRUS.

BY BRYANT WALKER.

Through the kindness of Mr. A. A. Hinkley, of Du Bois, Ill., I have had the opportunity of examining the *Amnicolidæ* collected on his recent trip to the Coosa river, and the larger portion of the species herein described are from his collection. The others have been received from the different sources stated in the descriptions.

The new species collected by Mr. Hinkley are remarkable for the diversity of form exhibited, which was quite unexpected in view of the very general similarity in that particular of the species already discovered. The collection also shows that the earlier collectors on the Coosa practically ignored the smaller forms in the more exciting pursuit of the peculiar *Pleuroceridæ* of the river, and that there yet remains much to be done before the molluscan riches of that wonderful stream will be exhausted.

The late Dr. Jas. Lewis in his "Fresh Water and Land Shells" (1876), lists four species of *Somatogyrus* as occurring in Alabama, viz :

S. aureus Tryon.

S. parvulus Tryon.

S. currierianus Lea.

S. subglobosus Say.

Having Dr. Lewis' collection in my possession, I am able to check up his determinations in the light of our present information. It is evident, from the condition of his specimens, many of which are not even washed, to say nothing of having the black and ferruginous deposits removed, with which they are frequently covered, that Dr.

Lewis had not given any critical study to the group, and that his determinations were at the best superficial. It is of interest therefore to consider his list *seriatim*, and to make such corrections as are necessary. *S. aureus*. Dr. Lewis confounded this species with *S. parvulus* Tryon and *georgianus* herein described. For the first error he is not wholly responsible, as the only genuine *parvulus* he had was received from Dr. Lea as *aureus*. His specimens from the "Tennessee River" and "Cahawba River" are *georgianus*. Those from the Coosa are partly *georgianus* and partly *aureus*. Those from the Alabama river are correctly named.

It may be added that *aureus* was found in the Coosa at Wetumpka by Mr. Hinkley, where it has also been collected by Mr. A. C. Billups. It is also in the Lewis collection from the Holston river, Tenn., the Etowah river, Ga., the Tennessee river, Jackson Co., Ala., and from Bridgeport, Ala. It was also collected by Dr. Pilsbry and myself in the Tennessee river at Knoxville, Tenn., on our return from the Pentadelphian expedition in 1901. I have it also from Decatur, Ala., collected by De Camp.

S. currierianus, Dr. Lewis' specimens from Decatur, Ala., are labelled "Type" and seem to be correct. See Pl. v, figs. 8 and 9.

S. parvulus. As stated above, the only specimens referable to this species (see Pl. v, figs. 22 and 23) from the Connesauga river, Ga., were received from Dr. Lea under the name of *aureus*. His specimens from the Tennessee river at Bridgeport, Ala., are immature *aureus*, as are also those from the Coosa.

S. subglobosus. There are no specimens under this name from the Coosa river in the Lewis collection. Those from the Alabama river, while differing somewhat in contour from the typical form of the Ohio valley, seem substantially the same.

The characteristic feature of the Coosa river species of *Somatogyms* is the heavy flat columellar callus, which usually quite obliterates the umbilicus. This is present in nearly all the species. The former connection of the Coosa with the Tennessee drainage is shown by the occurrence of *S. subglobosus*, *aureus* and *georgianus* in both systems and the narrow, rounded columellar callus in *S. obtusus* and *umbilicatus*, which is characteristic of all the species of the Ohio and Tennessee drainage, except *S. georgianus* and the form referred to *S. currierianus* by Tryon in Mon. F. W. Univ. Moll., p. 62, Pl. 17, fig. 13.

All the figures are drawn on the same scale so that the relative size of the different species is represented on the plate.

Somatogyrus hinkleyi n. sp. Pl. v, figs. 1 and 2.

Shell globose-conic, imperforate or with a mere chink at the umbilicus, light horn-colored, smooth, growth lines scarcely evident. Spire elevated, apex obtuse. Whorls $4-4\frac{1}{2}$, those of the apex convex, penultimate and body whorls more or less shouldered; suture deeply impressed; body whorl large, convex or in shouldered examples somewhat flattened at the periphery and obtusely angled below. Aperture large, rounded above, somewhat flattened at the base and decidedly angled at the junction of the lip with the base of the columella and angular at the upper insertion of the lip; lip simple, in aged examples somewhat thickened within. Columella heavy, callused, flattened and nearly straight, callus thinner on the parietal wall. Alt. $4\frac{3}{4}$, diam. $3\frac{3}{4}$ mm. Alt. 5, diam. $3\frac{1}{2}$ mm.

Coosa river at Wetumpka, Ala. (type locality), five miles above Wetumpka, Wilsonville and Fort Williams' Shoals. Also Tallapoosa river at Tallassee, Ala.

This fine species was collected by Mr. Hinkley in considerable numbers at all the localities above mentioned, except at Tallassee, where only a single specimen was found. It occurred "on rocks in swift water, generally on the under side. Sometimes several individuals were found close together." It differs from all the known species in the elevated spire and conical form excepting *S. pennsylvanicus* and *virginicus* herein described, but those species are much smaller and decidedly different in contour. Young shells have the whorls decidedly convex, the shoulder not appearing until after the third whorl. The penultimate whorl shown in its entirety in half-grown specimens is usually quite quadrate, owing to the shoulder and flattening of the periphery. In mature specimens the shoulder tends to become less evident and often entirely disappears. I take great pleasure in naming this unusual form after its discoverer, Mr. A. A. Hinkley, whose recent trip to the Coosa was so fruitful in novelties.

Somatogyrus constrictus n. sp. Pl. v, fig. 3.

Shell small, conic, light horn-colored, smooth, except for the fine growth lines. Apex eroded in all specimens seen, the portion remaining consisting only of the last $2-2\frac{1}{2}$ subcylindrical whorls, which are very convex with a deeply-impressed suture, the body whorl is

somewhat inclined to be gibbous. Aperture small for the genus and nearly round, obtusely angled above. Columella concave with a heavy, flat callus, which extends unbroken between the extremities of the lip leaving the umbilicus scarcely exposed. Lip simple, somewhat flattened along the basal portion and obtusely angled at its junction with the columella. Alt. 3, diam. $2\frac{1}{2}$ mm.

Coosa river, five miles above Wetumpka, Ala. (type locality), also at Wetumpka and near Wilsonville.

Only a few specimens of this species were found by Mr. Hinkley at any of the above localities, "never more than one in the same place, and always on the under side of rock in swift water." Unfortunately all the specimens are badly eroded so that it is impossible to give the apical characters. No young specimens that can be referred to the species were found. This species is remarkable for its elevated amnicoloid shape and deeply constricted whorls, but the heavy columellar callus reveals its generic affinities.

Somatogyrus nanus n. sp. Pl. v, fig. 4.

Shell very small, imperforate, conic-globose, pale greenish-yellow, smooth, shining. Spire very short and rapidly acuminate to the sub-acute apex. Whorls 3, those of the spire but slightly convex, separated by a shallow suture; the body very large, forming most of the shell, convex, somewhat flattened toward the suture. Aperture quite narrowly-angled above, widening and regularly-rounded below. Columella concave, flattened, with a heavy callous, which entirely covers the umbilicus and becomes thin and transparent on the parietal wall. Alt. $2\frac{3}{4}$, diam. $2\frac{1}{2}$ mm.

Coosa river, five miles above Wetumpka, Ala. (type locality), also at Wetumpka, Wilsonville and Fort Williams Shoals above Farmer, Ala.

This little species is apparently the most abundant form in the Coosa. It was "found in all places on rocks in swift water, scattered or collected in bunches of any number up to 25 or 30." It is well characterized by its small size and the short, acute apex, which with large body whorl and slightly-impressed suture, gives a peculiar mamilliform shape to the shell. The shells are almost invariably covered with a thin, greenish deposit, which under the microscope appears to consist of innumerable, oval granules, closely but irregularly agglutinated on the surface.

Somatogyrus umbilicatus n. sp. Pl. v, fig. 5.

Shell small, globosely depressed, umbilicate, light greenish-yellow, smooth, except for the fine, rather unequal, lines of growth. Spire short, obtusely elevated. Whorls $3\frac{1}{2}$, those of the spire convex and separated by a well-impressed suture; body whorl large, gibbously convex. Aperture sub-circular, rather longer than broad, obtusely angled above and slightly flattened along the basal margin. Columella concave, narrowly reflected: columellar callus, moderately heavy, rounded, reflected over but not concealing the round, deep umbilicus, thin and transparent on the parietal wall. Alt. 3, diam. 3 mm.

Coosa river at Wetumpka, Ala. (type locality), also at Fort Williams Shoals above Farmer, Ala.

This species is remarkable for its depressed, valvata-like form and round, deep umbilicus, which readily differentiates it from all other known species of the genus. It does not appear to be very abundant at Wetumpka, and only a single example was collected at Fort Williams Shoals.

Somatogyrus coosaensis n. sp. Pl. v, figs. 6 and 7.

Shell small, globose, imperforate, light yellow, smooth, with very fine lines of growth. Spire very short, apex obtuse. Whorls $3\frac{1}{2}$, rapidly increasing, those of the spire but slightly convex and separated by a very shallow suture; body-whorl inflated, large and convex. Aperture large, very oblique, expanded and well rounded above, obliquely flattened at the base. Columella concave, with a heavy, flat callus, which entirely covers the umbilicus, but rapidly attenuates above the axis; parietal wall with a thin transparent callus. Lip simple, the upper extremity projected along the body whorl at its insertion, at which point it is abruptly curved in to meet the parietal wall and rapidly drawn back below, forming a decided angle where it unites with the base of the columella. Alt. $3\frac{1}{2}$, diam. 4 mm.

Coosa river at Wetumpka, Ala. (type locality), also five miles above Wetumpka, and at Fort Williams Shoals above Farmer, Ala. Very abundant at the first two localities, but only a single specimen was taken at the last. This species is about the size of *S. currierianus* (Figs. 8 and 9) to which it is closely related, but differs in the less elevated spire, slightly impressed suture, regularly rounded body

whorl, which is not shouldered as in that species, and in the decided angle at the junction of the columella with the basal lip. The bright honey-yellow color is eminently characteristic. It resembles young specimens of *S. crassus*, but differs in the particulars stated in connection with that species.

Somatogyrus obtusus n. sp. Pl. v, fig. 10.

Shell small, globular, narrowly umbilicate, greenish white, smooth, shining. Spire very short, apex obtuse. Whorls $3\frac{1}{2}$, those of the spire convex and slightly shouldered, separated by a well impressed suture, body whorl large, globosely convex. Aperture subcircular, rounded above, obtusely angulate below. Lip simple, meeting the body whorl at nearly right angles at its insertion on the parietal wall, expanded below and somewhat thickened within along the basal margin. Columella concave, narrowly reflected; columellar callus not very heavy, and rounded; parietal wall covered with a thin transparent callus. Umbilicus distinct, narrow, somewhat contracted by the reflected columellar lip. Alt. 3, diam. 3 mm.

Coosa river, just above the railroad bridge at Farmer, Ala.

Only eight examples of this distinct, little form were obtained, but they are very uniform, varying only in size. *S. obtusus* differs from nearly all the Coosa river forms in the narrow, rounded columellar callus and distinct umbilicus. In this respect it is allied to the species of the Tennessee and Ohio drainage, grouping around *S. integer*, but differs from them all in the obtuse apex, globular form and the decided angle at the junction of the columella with the basal lip.

Somatogyrus crassus n. sp. Pl. v, figs. 11 and 12.

Shell small, globose, very solid, imperforate, light greenish yellow, smooth, lines of growth very fine. Spire short, apex obtuse. Whorls about 4, those of the spire slightly convex, suture well impressed. Body whorl large, somewhat gibbous and swollen above. Aperture large, rounded above, somewhat flattened basally and obtusely angled at the junction of the lip with the columella. Lip simple, thickened within, by a deposit of callus. Columella concave, with a heavy, flat callus which extends from one extremity to the lip of the other, and entirely covers the umbilicus. Alt. (apex eroded) 4.25, diam. 4.25 mm.

Coosa river at Wetumpka, Ala. (type locality), also five miles above Wetumpka.

Only a single adult specimen was found. But quite a number of half-grown individuals occurred. This species differs from all the others known from the Coosa, except *S. georgianus*, in the solid shell, heavy columellar callus, thickened lip and in the inflation of the upper part of the body whorl. In these respects it resembles *S. georgianus*, but differs in size and in being imperforate, lacking the axial groove, less gibbous, and more globose. The apex is eroded in all the specimens so that the exact number of whorls could not be determined. The immature shells are about the size of *S. coosaensis* and somewhat resemble that species, but differ in the thicker shell, color, smaller and more regularly rounded aperture, which is scarcely angled at the base, the upper extremity of the lip is also less curved in at its insertion.

Somatogyrus georgianus n. sp. Pl. v, fig. 13.

Shell globose, turbinate, perforate, thick, solid, light greenish-yellow, smooth, except for fine growth lines. Spire short, obtuse. Whorls about four, those of the spire convex with a well-impressed suture, body-whorl large, very convex and inflated above. Aperture large, obtusely-angled above and broadly-rounded below. Columella concave with a very heavy, narrow callus, which extends to the upper insertion of the lip and is adnate to the body whorl only at its upper end, and below the narrow umbilicus is separated from the body whorl by a deep axial groove. Lip simple, but thickened within, its insertion on the parietal wall is below the periphery. Alt. (apex eroded) 5, diam. $4\frac{1}{2}$ mm.

Chattanooga river, Chattanooga Co., Ga. (type locality), also Tennessee river, Cahawba river and Alabama river, Ala. (Lewis Coll.).

A couple of indifferent specimens have been in my possession for several years, which were found among some *Pleuroceridae* collected by R. E. Call. A larger suite in Mr. Hinkley's collection from the same source, and three lots from the Lewis collection have served to confirm the distinctness of the form. This species resembles *S. sargenti* (pl. v, fig. 14) in the inflation of the upper part of the body whorl, but differs in lacking the shoulder characteristic of that species and in the peculiar formation of the columella, which is unlike that of any other species except *S. pumilus* Con. and *S. trothis* Doh. It also resembles *S. crassus*, but is larger, the body whorl more elong-

ated and more inflated above and has an entirely different form of columellar lip. Dr. Pilsbry has kindly compared some of the Tennessee river specimens with the unique type of Conrad's *pumilus*, and writes that while *pumilus* has the same peculiar axial groove, it is smaller (alt. 3.9, diam. 3 mm.), different in color and has the aperture more oblique. Doherty's species is smaller, about the size of *S. integer*, and has the axial groove only slightly developed. The three species, however, form a natural group more closely related to each other than to the other species in the genus. Many of the specimens in the Lewis collection have the aperture rather more expanded below than in the typical form.

This species is apparently ovoviviparous. In four out of fifteen examples in the lot from the Tennessee river, young shells of about $2\frac{1}{2}$ whorls and about $1\frac{1}{2}$ mm. in height and breadth were found lodged behind the opercula of the adults in various degrees of extrusion. In two cases the young shells dropped out in the cleaning process, the outer edge of the operculum being forced out of its normal position to allow the passage of the young. In the other two, the young are further within the shell and the operculum is set in nearly its usual position. An interesting monstrosity, which apparently belongs to this species, occurred in the lot from the Cahawba river. Nearly the whole of the body whorl is encircled at the periphery by a strong carina. It appears from beneath the upper insertion of the lip and continues around the whorl about three-fourths of the circumference, when it rapidly subsides and entirely disappears before the lip is reached. There is no trace of it on the upper whorls that remain. The axial groove is bounded on the inner side by a sharp angle, which merges into the edge of the lip at the base.

Somatogyrys pennsylvanicus n. sp. Pl. v, figs. 15 and 16.

Shell small, obtusely conic, narrowly umbilicate, sometimes imperforate, light horn-color, smooth, with very fine growth-lines. Spire elevated, apex obtuse. Whorls about $4\frac{1}{2}$, convex, slightly flattened toward the suture, which is well impressed. Aperture ovate, less than half the length of the shell, angled above and rounded below, slightly flattened along the basal lip. Columella nearly straight with a rather heavy, but narrow, rounded callus, which is thin and transparent in the parietal wall. Umbilicus a mere chink or entirely covered by the callus deposit. Lip simple, somewhat thickened within, especially on the basal part. Alt. $3\frac{3}{4}$, diam. $2\frac{1}{2}$ mm.

Columbia, Pa.

About thirty specimens of this amnicola-shaped species were in the collection of the late Dr. G. A. Lothrop, labelled *Amnicola decisa*, but unfortunately with no indication from whom they were obtained. The large number of species from that locality in the collection would indicate that Dr. Lothrop had been in correspondence with some collector residing in that vicinity. At first sight, it would be taken for an *Amnicola*, but the columellar callus is decisive on its generic position, which is confirmed by the allied *S. virginicus* and by Mr. Hinkley's discovery of a somewhat similar elevated form (*S. hinkleyi*) in the Coosa. It is similar in shape to that form, but is smaller, the whorls more rounded, the columellar callus is narrower and rounded, and there is no decided angle at the junction of the basal lip with the columella. In shape it resembles also somewhat *S. virginicus* but differs in the particulars pointed out in connection with that species.

Somatogyrus virginicus n. sp. Pl. v, figs. 17, 18 and 19.

Shell small, globosely conic, imperforate, light greenish-yellow, smooth, shining, lines of growth very fine. Spire elevated, obtusely conic. Whorls about 4, those of the spire convex, with a well-impressed suture, body whorl subglobose, regularly convex. Aperture ovate, angled above and broadly rounded below. Umbilical region impressed, but covered by a rather broad, rounded columellar callus which becomes thinner and transparent on the parietal wall. Columella nearly straight. Lip thin and sharp. Alt. (fig. 18) $3\frac{3}{4}$, diam. 3 mm. Alt. (fig. 17) $3\frac{1}{2}$, diam. $2\frac{1}{2}$ mm.

Barnard's Ford, Rapidan R., Va. (W. J. Farrer Coll.)

This species in its elevated form resembles *S. pennsylvanicus*, and the two with *S. hinkleyi* form a natural group quite distinct in shape from all the other known species. It differs from the latter in its smaller size, more convex body whorl and narrow, rounded columellar callus, and from the former in being somewhat larger, less solid, more globose, thin lip, color and especially in the impressed umbilical area, which is one of the most distinctive specific characters. Like many of the *Amnicolæ*, there are two forms represented in the series, one being decidedly more slender than the other as shown by the figures, otherwise they are entirely similar. This is probably a sexual difference, but has not been observed in any other species of this genus.

Somatogyrus pilsbryanus n. sp. Pl. v, figs. 20 and 21.

Shell small, gibbous-globose, scarcely perforate, rather thin, light yellow-horn colored, smooth, lines of growth very fine. Spire short, conic, obtuse. Whorls $3\frac{1}{2}$, those of the spire convex, separated by a well-impressed suture, body whorl large, very convex, gibbous. Aperture large, widely ovate, obtusely angled above and regularly rounded below. Umbilical region impressed. Umbilicus a mere chink. Columella concave, with a heavy, flat callus, which becomes thin and transparent on the parietal wall. Alt. 3, diam. 3 mm.

Tallapoosa river, Tallassee, Ala.

This is another of the new species discovered by Mr. Hinkley. It occurred quite abundantly and is a well marked and distinct form. It is related to *S. parvulus*, Tryon (Pl. v, figs. 22 and 23), in general appearance, but differs in the wide, gibbous body whorl, more obtuse apex and in the heavy, flat, columellar callus, *S. parvulus* being more acutely conical, with the body whorl regularly rounded and with a narrow, rounded, columellar callus. Dr. Pilsbry has kindly compared it with the types of Tryon's species and concurs in its specific distinctness. I take great pleasure in naming it after him.

A NEW SUBSPECIES OF POLYGYRA TRIDENTATA.

BY H. A. PILSBRY.

Polygyra tridentata discoidea n. subsp.

The shell is larger than *tridentata*, more depressed, the spire usually nearly flat. Whorls $5\frac{1}{2}$, closely and sharply striate. Umbilicus more widely expanding at its opening, showing more of the preceding whorl. The aperture is more or less "dished," the parietal tooth directed towards the upper lip-tooth, which while varying somewhat in shape has a tendency to be rather wide and flat-topped. The lower lip-tooth is more acute, both being strictly marginal.

Alt. $9\frac{1}{2}$, diam. $20\frac{1}{2}$ mm.

Alt. 8, diam. 19 mm.

Alt. $8\frac{1}{2}$, diam. $18\frac{1}{2}$ mm.

Charleston Landing, Clarke Co., Southern Indiana. Cotypes in coll. A. N. S. P. and of L. E. Daniels.

During a recent visit, Mr. G. H. Clapp called my attention to the form of *P. tridentata* found around Cincinnati, and widely known in

collections. A recent sending from Mr. L. E. Daniels of the same race from a point further down the Ohio valley is made the occasion for describing it. The subspecies seems to be a characteristic and abundant form along the lower Ohio river, its range southwestward as well as up the river still remaining to be ascertained.

It resembles the large *P. tridentata complanata* in shape, but is invariably sharply striate and does not reach so large a size.

DESCRIPTION OF TWO NEW TERTIARY FOSSILS.

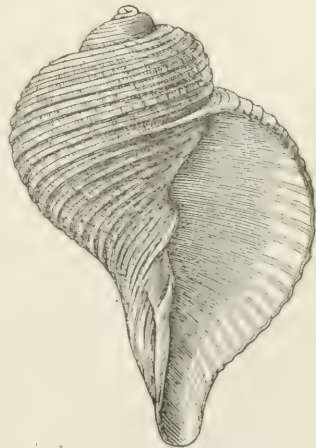
BY CHARLES W. JOHNSON.

Cancellaria rapella n. sp.

Shell very fragile, spire but slightly elevated, depressed and excavated near the suture, with three and one-half whorls including the protoconch, the latter smooth and consisting of one and one-half whorls; body whorl with about twenty-five spiral ridges, those on the central portion flattened and obsoletely grooved, lines of growth prominent and on the spire give the interstices between the spirals a punctated appearance; columella with two prominent folds and a slight umbilical rimation. Length, 29 mm.

Miocene, Magnolia, Dauphin Co., North Carolina.

One specimen of this delicate shell was found while cleaning the marl from the interior of a large *Busycon maxima* var. *tritonis* Conr., collected by Mr. Joseph Willcox. It is related to *C. venusta* Tuomey and Holmes, but the shell is much thinner, spire less elevated and excavated near the suture. Type in the museum of the Wagner Free Institute of Science, Philadelphia.

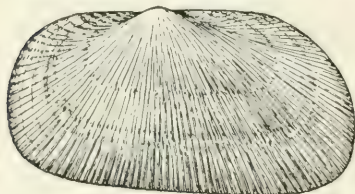


CANCELLARIA RAPELLA.

Linaria? divaricata n. sp.

Shell very thin, compressed, nearly equilateral, umbones smooth,

from which extend upwards of sixty radial ribs, those of the anterior



LINEARIA DIVARICATA.

and posterior divaricating toward their respective margins, a few of the upper ones curving upward to the hinge line, the larger ribs frequently forked near the margin, lines of growth quite prominent. Length 15, alt. 8, diam. 4 mm.

Eocene (Lower Claiborne), Berryman's place, two miles northeast of Alto, Cherokee Co., Texas. Type in the Lea collection of the Academy of Natural Sciences, Philadelphia (Acc. no. 9706).

This interesting specimen represents both valves intact, the matrix filling the interior is quite hard and the shell so thin that an attempt to develop the hinge would undoubtedly destroy the specimen. I can therefore only refer it doubtfully to the genus *Linearia* until more material is obtained.

GENERAL NOTES.

OCCURRENCE OF ZINC IN FULGUR.—In *Science* for January 29, 1904, P. 196, Mr. Harold C. Bradley, of Yale University, states that: "In the course of an investigation on the chemical physiology of certain invertebrates, undertaken under the direction of Dr. Lafayette B. Mendel, it was found that the ash of the hepatopancreas of the large carnivorous gastropod *Sycotypus canaliculatus* contains an element hitherto unobserved in such connection, namely zinc * * * samples of ash from *Sycotypus canaliculatus* gave approximately eleven per cent. and twelve per cent. respectively of ZnO."

"At the same time qualitative examinations were made of specimens dredged from various parts of Long Island Sound about New Haven and in all cases zinc was found in large quantities in the ash of *Sycotypus* and *Fulgur carica* * * * The significance of this unique occurrence of zinc in the economy of *Sycotypus* and *Fulgur* is still to be determined, as is the nature of the combination in which it exists. These points, together with the distribution of the element in other marine forms about the Sound, are at present being investigated."

THE SENIOR EDITOR OF THE NAUTILUS is on a collecting trip through Florida and Cuba. He will return the latter part of April.

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EDITORS AND PUBLISHERS:

H. A. PILSBRY, Curator of the Department of Mollusca, Academy of Natural Sciences
PHILADELPHIA.

C. W. JOHNSON, Curator of the Boston Society of Natural History,
BOSTON.

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No. 1.

TWO NEW SPECIES OF PLEUROTOMA FROM CALIFORNIA.

BY WILLIAM JAMES RAYMOND.

Subgenus GENOTA H. and A. Adams.

Section *Dolichotoma* Bellardi.

Pleurotoma (*Genota*) *stearnsiana*, new species.

Shell broadly fusiform, spire acute, outline of spire moderately convex; whorls eight and one-half, convex anteriorly, slightly concave near the suture, the margin at the suture strongly appressed; suture distinct; aperture longer than the spire; color orange to cream, a broad, spiral, brown band below the suture and nine or ten narrow, clearly-defined bands on the last whorl, one or two of these also visible on the spire, bands nearly as wide as the lighter interspaces; interior of aperture yellowish, lighter within and spotted with brown on the outer lip by the external bands; first two whorls smooth, later whorls with numerous revolving threads, closely beaded on the spire by incremental lines which follow the outline of the lip, threads not beaded below the periphery of the last whorl, but roughened by the growth-lines and somewhat coarser anteriorly; aperture rather narrow; posterior sinus shallow, rounded; lip acute, produced below the sinus, canal wide; pillar solid, somewhat curved, obliquely truncate below. Operculum normal. Long. of shell 30.5, of aperture and canal 17, of body-whorl 23 mm.; max. diam. 13 mm. Divergence 50°. An extremely old specimen which shows a thickening of the pillar like an obscure fold, measures: long. of shell 41.5,

of aperture and canal 22.5, of body-whorl 29.5 mm.; max. diam. 18 mm. Divergence 48° . This specimen was dead when collected.

University of California Marine Biological Laboratory, stations 55 and 67, off San Diego, 25 to 30 fathoms, sand and mud, bottom temperature 50° F. Also dead specimens from stations 21 and 28, Catalina Island, 30 to 40 fathoms, sand and mud, bottom temp. 51° F.

P. (Genota) stearnsiana is at once separable from the forty or more specimens of its nearest ally, *P. carpenteriana*, examined by the writer. The former species is very uniform, although found in different localities. With the same number of whorls it is half as large as *P. carpenteriana* and is proportionately broader. The average ratio of length to diameter is 2.38 in five specimens of *P. stearnsiana*, in five specimens of *P. carpenteriana* it is 2.70. The spire is proportionately shorter in the former species and the brown bands are more conspicuous. *P. carpenteriana* has been found in the California Pliocene and Pleistocene and seems to be the first in time of a closely related group, embracing besides the two species already named, *P. tryoniana* Gabb, Pleistocene and Recent, and *P. cooperi* Arnold, found thus far in the Pleistocene of San Pedro only. It gives me great pleasure to dedicate the present species to Dr. Robert E. C. Stearns, known to all students of West American conchology.

Section *Antiplanes* Dall.

Pleurotoma (Antiplanes) catalinae, new species.

Shell sinistral, thin, elongated, slender, whorls ten to eleven; color light, pinkish-brown, without bands, interior of aperture a little lighter; upper whorls more or less chalky; nucleus smooth, inflated; later whorls convex, suture deeply impressed; sculptured by fine incremental lines and on the last whorls a few obscure, spiral striations, mostly below the periphery; anal fasciole traceable on the spire as a flattened or obscurely grooved band; aperture narrow; canal wide and short; pillar nearly straight, with a well-defined callus, obliquely truncate below; outer lip produced, deeply emarginate near the sutural margin of the whorl. Long. of shell 27, of aperture and canal 10.5; max. diam. 7.6 mm. Divergence 20° . Dredged in 125 fathoms, green mud, off Catalina Island, living, U. C. M. B. L. Station 36; off Point Loma, San Diego, 50 fathoms, Station 72 (a single, dead specimen); off Point Loma, 106 fathoms, green mud and sand, bottom temperature 47.9° F., Station 73.

This attractive shell is much like a reversed *P. (Antiplanes) santarosana* Dall, in color and sculpture, but the whorls are more oblique besides being reversed, and the spire is even more slender than in Dall's species. *P. (Antiplanes) catalinae* was found associated with *P. (Antiplanes) perversa* Gabb, which is also sinistral. The latter species is wider, has less rounded whorls and the color is a darker brown with a light, spiral band, as stated by Gabb in his original description. The two species are readily separated.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota (Plectotropis) pannosa var. *awashimana* n. var.

This race is similar to *E. pannosa* in color, texture, sculpture and the profuse peripheral fringe, but differs in being much smaller, proportionally higher, with decidedly narrower umbilicus, which is not enlarged at the opening, the base being almost angular around it. Whorls $5\frac{1}{2}$, the last very shortly and slightly deflexed in front. It is more robust and less depressed than *E. deflexa*. Alt. 8, diam. 13 mm.

Awashima, Echigo. Types no. 86495, A. N. S. P., from no. 1164 of Mr. Hirase's collection.

Two species of *Plectotropis* have been described by A. Adams from Awashima: *H. setocincta* and *H. scabricula*. The first measures about 12x6 mm., the altitude half the diameter, being therefore more depressed than *awashimana*, in which the alt. is nearly two-thirds the diam. *H. scabricula* is about 9x6 mm., with $6\frac{1}{2}$ whorls, the last "subangulate" peripherally. This species is therefore smaller than *awashimana*, with more whorls and blunter ambitus.

Helix conella A. Ad., 1868, from "Tabu-Sima" (not *H. conella* Pfr., 1861), is probably a synonym of *Plectotropis deflexa* Pfr., from the same island.

Eulota (Plectotropis) shikokuensis subdivesta n. subsp.

Shell more depressed than *E. shikokuensis*, and smoother, the oblong granules bearing no cuticular scales, the periphery without a fringe. Whorls nearly 6, the last very shortly and abruptly de-

flexed in front. Umbilicus more broadly open. Alt. 7, diam. 16 mm., umbilicus 5 mm. wide.

Sodayama, Tosa. Types no. 84783, A. N. S. P., from no. 1022 of Mr. Hirase's collection.

E. s. var. hadaka (NAUTILUS xvii, 105) is a much less depressed form, measuring, alt. 9.5, diam. 16, umbilicus 4 mm. wide, and alt. 8, diam. 14 mm.

Eulota (Aegista) eminens n. sp.

Shell broadly and deeply umbilicate, low-trochiform, dull yellowish-brown, finely striate, the last striæ on the last whorl broken into low granules, which when quite unworn bear short cuticular laminae in places. Spire convex-conic. Whorls $6\frac{3}{4}$ to 7, slightly convex, closely coiled, and very slowly widening, the last whorl obtusely subangular at the periphery, and descending a little in front, very convex beneath. Aperture very oblique, rounded, about one-fourth of the circle excised at the parietal wall. Peristome thin, narrowly expanded, reflexed below. Alt. 7.3, diam. 10.8, width of umbilicus 3 mm.

Toba, Shima. Type no. 86493 A. N. S. P., from no. 590a of Mr. Hirase's collection.

This species belongs to the group of *Aegista mimula*, but differs from all the known species by its elevated spire, higher than in any other Japanese *Aegista*, and approaching the contour of the species referred to the section *Cælorus*.

Eulota (Aegista) mimula var. *goniosoma* n. var.

This race resembles *mimula*, *trachyderma* and *mikuriyensis* in the rather small aperture with thin, expanded lip, subreflexed below, but not thickened within. The spire is low conoid-convex, the periphery strongly angular and the base convex, abruptly curving into the wide umbilicus. The lusterless surface is brownish-yellow, freckled with buff dots, finely, rather irregularly striate, and in some specimens retaining short, triangular cuticular laminae below the periphery. Whorls $5\frac{1}{2}$ to $5\frac{3}{4}$. Alt. 6.5, diam. 11.3 to 12 mm., width of umbilicus 4 mm.

Amagisan, Izu. Types no. 86462 A. N. S. P., from no. 1165 of Mr. Hirase's collection.

On account of its strongly angular periphery, this might be con-

sidered a distinct species, and it may prove to be so ; but it belongs to a group of forms which may for the present be ranked as subspecies of *E. mimula*, and including the following :

E. mimula Pils.

E. mimula trachyderma Pils. & Gude. (*E. aperta trachyderma*, Proc. A. N. S., 1901, 614).

E. mimula mikuriyensis Pils. (*E. aperta mikuriyensis*, Naut., xvi, 45).

E. mimula goniosoma Pils. & Hir.

Punctum elachistum n. sp.

Shell umbilicate, depressed, brown, the first whorl whitish. Whorls $2\frac{3}{4}$, the last one sculptured with rather widely spaced lamellæ and close spiral striæ in the intervals, the spire nearly smooth. The whorls enlarge rapidly, and the last one is somewhat compressed below the periphery, which is rounded. The aperture is large, oblique and rounded, about one-fourth of the circle excised by the preceding whorls. Alt. 7, diam. 1.2 mm.

Yanagawa, Chikugo. Types no. 86492 A. N. S. P., from no 1159 of Mr. Hirase's collection.

There are fewer whorls than in *P. leptum*, which is also a little larger, and judging from the figures, more densely lamellose.

Punctum apertum n. sp.

Shell broadly umbilicate, depressed, thin, brownish-corneous, sculptured with delicate, thread-like riblets, in large part cuticular. Whorls 3, convex, parted by an impressed suture. Aperture oblique, rounded, slightly more than one-fourth of the circle excised by the preceding whorl ; peristome thin and simple. Alt. 7, diam. 2mm.

Nemuro, Nemuro. Types no. 86490 A. N. S. P., from no. 1156 of Mr. Hirase's collection.

This little snail from the northeastern province of Yesso, is distinguished by its depressed form and wide, shallow umbilicus.

Zonitoides chishimanus n. sp.

Shell openly umbilicate, whitish-corneous, thin ; closely and delicately rib-striate, densely and finely striate spirally between the lamellæ. Spire convex. Whorls nearly $3\frac{1}{2}$, convex, slowly increasing, the last rounded peripherally and below. Aperture quite ob-

lique, wide-lunate, the peristome simple and thin. Alt. .7, diam. 1.1 mm.

Kunashiri, Chishima chain (Kuril Is.). Types no. 86491 A. N. S. P., from no. 1155 of Mr. Hirase's collection.

This very small, whitish species is more closely sculptured than any Japanese *Punctum*, unless *P. leptum* Westerl. be an exception. That species from Nagasaki is larger and has a much narrower umbilicus.

Macrochlamys chaunax n. sp.

Shell perforate, convex-conic above, more convex below the slightly obtusely angular periphery, the angle above the middle; thin, somewhat transparent, pale yellow. Surface brilliantly glossy, showing some slight growth-wrinkles and densely-crowded, very minute spiral striae. Whorls 4, moderately convex, the last about double the width of the preceding, subangular, the angle becoming obsolete at the aperture. Aperture rather large, rounded-lunate. Peristome simple and thin, reflexed at the columellar insertion. Alt. 2.7, diam. 4.5 mm.

Imotoshima, an islet south of the Hahajima, Ogasawara. Types no. 83030 A. N. S. P., from no. 899 of Mr. Hirase's collection. Also found on Hahajima.

Macrochlamys cerasina shinanoensis n. subsp.

Shell resembling *M. cerasina* and *M. gudei*, but much larger than the former, more globose and more glossy than the latter. There are $6\frac{1}{2}$ convex, very slowly widening whorls, the last one angular at the periphery in front, becoming rounded on the latter part. Spire low conic, with nearly straight outlines. Base strongly convex, impressed around the narrow axial perforation, which is nearly concealed by the triangular dilation of the columellar lip. Alt. 10.4, diam. 7.4 mm.

Enasan, Shinano. Types no. 86483 A. N. S. P., from no. 1173 of Mr. Hirase's collection.

Tornatellina monodonta n. sp.

Shell imperforate, ovate-conic, thin, pale yellowish corneous, imperfectly transparent, almost smooth. Spire straightly conic, the apex obtuse. Whorls $4\frac{3}{4}$, moderately convex, the last somewhat swollen. Aperture oblique, ovate, somewhat less than half the total length. Outer lip thin and simple, columella strongly twisted, form-

ing a white spiral fold. No parietal lamella. Length 3, diam. 1.9 mm.

Imotojima, Ogasawara. Types no. 86479 A. N. S. P., from no. 1158 of Mr. Hirase's collection.

This form is distinguished at once from others described from Ogasawara-jima and the islands of Izu by the absence of a parietal lamella. It occurs also on Hahajima, no. 1158a of Mr. Hirase's collection.

Carychium nipponense n. sp.

Shell oblong, with a rather wide spire and obtuse apex, clear, transparent corneous, smooth and glossy. Whorls 4, convex, the suture well impressed. Aperture oblong, oblique, with a single, small, acute lamella at the middle of the inner margin, and a larger tubercle opposite to it within the outer lip, which is thickened throughout. Length 1.3, diam. .6 mm.

Sendai, Rikuzen. Types no. 86441 A. N. S. P., from no. 1157a of Mr. Hirase's collection.

A dwarf among pygmies. It is like *C. hachijoense* in its polished surface, but differs in the wide spire, not tapering regularly as in that insular form. *C. noduliferum*, *pessimum* and *borealis* are all conspicuously striate. *C. noduliferum* and *C. nipponense* are the only species at present known from the main island of Japan. Specimens sent from Uji-Yamada, Ise, indicate that *C. nipponense* has a wide range along the ocean coast of Nippon.

Alycæus oshimanus n. sp.

Shell of the depressed low-conoid shape of other Japanese species, the umbilicus oblong, the last whorl deviating tangentially about half-way across the preceding. Whorls $3\frac{3}{4}$, the first two smooth, reddish or yellowish, the following whorl rib-striate, at first finely and closely, but on the first half of the last whorl the riblets become quite widely spaced. Last half of the last whorl swollen, and very much more finely and closely sculptured than any other part of the shell; the neck rather strongly contracted, then swollen and sculptured again. Aperture very oblique, circular, the lip strengthened by an external rib, built forward beyond the rib, the upper and lower margins arched forward a little. Alt. 2, diam. 4 mm. Operculum thin, yellow.

Oshima, Osumi. Types no. 83385 A. N. S. P., from no. 931 of Mr. Hirase's collection.

This species differs from the allied *A. vinctus* in its sculptured neck and less developed "collar" or lip-rib. No land shell of the important island of Oshima is known to be identical with species of Kyushu or of the main island of Japan.

Stenothyra formosana n. sp.

Shell small, ovate, smooth and glossy, yellowish olivaceous. Spire convex-conic, about 4 whorls remaining, the earlier ones being eroded. Last whorl moderately inflated, distinctly compressed from back to face, strongly contracting to the aperture, which is subvertical, ovate, and not much exceeding one-third the length of the shell. Length 3.9, diam. 2.2 mm.

Kironten, Formosa. Types no. 86485 A. N. S. P., from no. 159 of Mr. Hirase's collection.

This small, plain species is related to a form in the collection of the Academy labelled *S. glabra* A. Ad., but is very much larger, and not quite so much contracted at the aperture. *S. glabra* was not very fully defined by Adams. It was described from Peiho, but has been reported from Formosa by Nevill, Handlist Ind. Mus., p. 43.

Melania hahajimana n. sp.

Shell rather thin and light, yellowish olive, usually with some indistinct reddish longitudinal streaks on the spire; somewhat glossy, sculptured with irregular, unequal but fine spiral grooves and striæ, which on the spire cut the longitudinal growth-wrinkles into oblong beads, irregularly and unevenly developed. The spire is slender with slightly concave outlines. Apex eroded, 6 or 7 remaining whorls but slightly convex, separated by an impressed, oblique suture. Last whorl inflated in the middle. Aperture ovate, oblique, broadly rounded below, the thin lip slightly sinuous.

Length 34, diam. 10.5, length of aperture 10.5 mm.

Length 30, diam. 10, length of aperture 10.8 mm.

Hahajima, Ogasawara. Types no. 8645 A. N. S. P., from no. 172 of Mr. Hirase's collection.

The slender spire, thin texture and inflated last whorl widely separate this form from *M. boninensis* of Chichijima, the only Melanian hitherto known from the Ogasawara-jima. It is related to *M.*

tuberculata (Müll.), a widely distributed Oriental form, much more strongly sculptured, with more convex whorls.

M. boninensis Lea has been found to grow much larger than the original examples, reaching a length of 32.5 mm.

Melania libertina var. *gigas* n. v.

Very large, finely striate spirally, more coarsely so at the base, but without longitudinal folds. Olivaceous-brown, yellow in places, with some darker-brown streaks; the color concealed by a black ferrous coat. Length of decollate shells with about 4 to $4\frac{1}{2}$ whorls remaining, 48 to 51, diam. 20 mm., length of aperture 21 to 22 mm.

Arato, Echizen. Types no. 86441 A. N. S. P., from no. 171 of Mr. Hirase's collection.

This is the largest Japanese Melanian now on record. Some specimens of *M. löbbeckiana* are longer, but they are not so stout in figure.

A SINGULAR EOCENE TURBINELLA.

BY WILLIAM HEALEY DALL.

A singular *Turbinella* has recently been received from Mr. S. W. McCallie, of Georgia, which seems to stand, to some extent, between the two well known types, *Turbinella* proper and *Vasum*.

Psilocochlis subg. nov.

Shell thick and heavy, with depressed dome-like spire and few whorls, a strong siphonal fasciole surrounding a wide umbilical funnel, which is completely filled by a heavy deposit of callus, which also extends to the posterior angle of the aperture; the pillar exhibits three strong elevated plaits, and the surface is smooth or free from ribs, nodules, or prominent sculpture of any kind. Type:

Turbinella (*Psilocochlis*) *McCallie* sp. nov.

Shell short and broad, with about four whorls, of which all but the last are very small; apex hardly rising above the last whorl, which is dome-shaped above and widest at about the level of the posterior angle of the aperture, diminishing forward and slightly constricted behind the strong and flaring siphonal fasciole; umbilical funnel smooth, but nearly filled with a smooth appressed mass of callus, con-

tinuous over the body, and much thickened behind; pillar straight, with three strong plaits, canal shallow, short; suture distinct, surface smooth except for very fine incremental and revolving lines; outer lips broken, but apparently simple and sharp. Length 50, max. breadth about 38 mm., diameter of umbilical funnel about 20 mm.

Horizon: Claibornian Eocene of Richmond Co., Ga.

This singular shell has very much the aspect of *Pyrula smithii* Lea (*Lacinia alveata* Conrad), Contr. to Geology, pl. v, fig. 162; but has a lower spire, and is wider and rounder at the shoulder, beside having the strong plaits on the pillar which do not exist in *Lacinia*. It will be illustrated in a forthcoming publication. Meanwhile collectors should be on the lookout for it.

NEW VARIETIES OF AMERICAN LIMNÆAS.

BY FRANK COLLINS BAKER.

Limnæa reflexa iowaensis var. nov.

Shell thin, with a short, dome-shaped spire; whorls $5-5\frac{1}{2}$, rather flat-sided, loosely coiled; suture well marked but not profound; aperture with the characteristic turret of typical *reflexa*, with a heavy plait extending across the columellar callus; spire and aperture of equal length; color dark horn, either plain or with spiral or longitudinal zebra-like markings; aperture marked internally by several longitudinal red bands, indicating the position of former peristomes; umbilicus covered.

Length 28.50, width 12.00, aperture length 13.50, width 7.00 mill.

Length 30.00, width 11.50, aperture length 15.00, width 7.00 mill.

Length 26.50, width 11.50, aperture length 14.00, width 7.50 mill.

Length 26.00, width 11.00, aperture length 12.00, width 6.00 mill.

This peculiar variety was found in a collection recently sent to the writer for study, by Mr. Bryant Walker. It differs from all forms of this species in having the spire and aperture of equal length, in the peculiar dome-shaped spire and in the general robust appearance.

In the Illinois and Michigan Canal, at Joliet, this variety is found and shows a perfect gradation from the short, stumpy variety, with

spire and aperture of equal length, to the long, spiral *reflexa*. In this lot one may trace the variation from *iowaensis*, through *umbrosa* and *jolietensis* to typical *reflexa*.

In a lot of shells received from Mr. Henry Hemphill, four specimens were found which appear to belong here. Two specimens are fairly typical, while two show a variation toward variety *umbrosa*. They are from Lake Albert Lea, Minnesota. The types are from Muscatine, Iowa.

Limnæa reflexa crystalensis nov. var.

Shell solid, with dome-shaped spire; whorls 5-6, flatly rounded, loosely coiled; sutures not impressed, but well marked; spire of variable length, but typically about the length of the aperture; aperture long-ovate, peristome with a heavy internal rib; columellar callus heavy, spreading over the inner lip and crossed by a strong plait; umbilical region showing a slight perforation beneath the overhanging columellar callus; color light or dark horn, some species are strongly zebra-marked, and all exhibit the fine wavy sculpture of this group of *Limnæas*. It seems sometimes malleated.

Length 19.50, width 8.00, aperture length 9.00, width 4.00 mill.

Length 21.00, width 8.00, aperture length 10.00, width 5.00 mill.

Length 22.00, width 9.00, aperture length 10.50, width 5.50 mill.

Length 23.00, width 8.50, aperture length 10.50, width 5.00 mill.

Length 23.50, width 10.50, aperture length 12.50, width 5.50 mill.

Length 28.00, width 10.00, aperture length 12.00, width 6.00 mill.

Length 23.50, width 9.00, aperture length 11.00, width 5.00 mill.

Length 28.00, width 9.00, aperture length 11.50, width 5.50 mill.

This variety may be collected in countless numbers at Crystal Lake, Illinois. The lot from which this description was drawn numbers 105 specimens, and was collected by Dr. N. H. Lyon. This variety bears the same relation to *reflexa* that variety *michiganensis* Walker does to *palustris*, and its growth is probably governed by the same physical conditions.

Limnæa reflexa hemphilliana nov. var.

Shell rather solid; color light horn; whorls 6, very flat-sided, loosely coiled, nuclear whorls very dark red; sutures not impressed; spire acutely pyramidal, about as long as the aperture; aperture elongate-ovate; peristome thin, bordered internally by a red band;

columella oblique, with a rather heavy plait; parietal wall covered by a spreading callus which almost closes the umbilicus; some specimens show a tendency to become malleated.

Length 27.00; width 11.00; aperture length 14.00; width 7.25 mill.

Length 27.00; width 11.50; aperture length 15.00; width 7.50 mill.

Distribution: Lake Albert Lea, Minnesota.

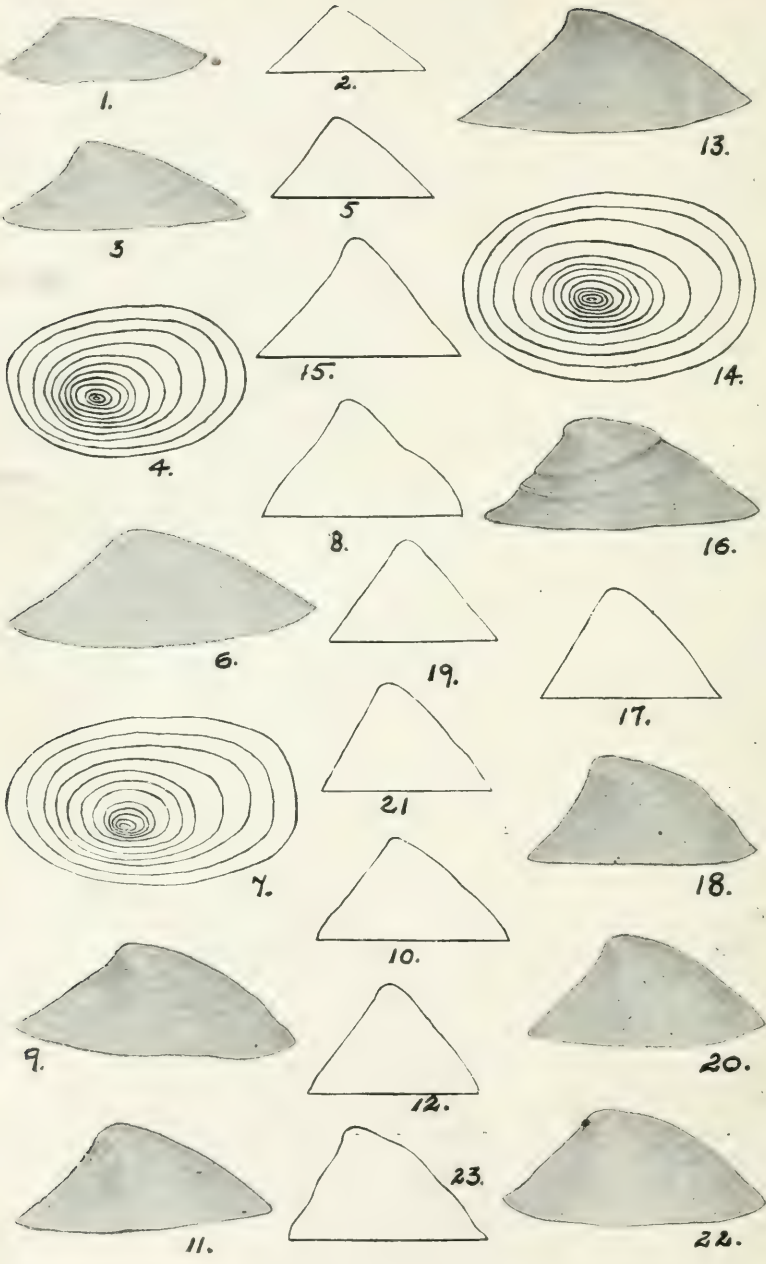
Specimens of this very distinct variety were found in a lot of shells received from Mr. Bryant Walker. They look like a widened-out variety *exilis* with a short spire. They have some relation to the variety *iowaensis*, but the spire is sharply conic, while in that variety it is dome-shaped.

GENERAL NOTES.*

LIMAX MAXIMUS L. IN CALIFORNIA.—The United States National Museum has recently received several specimens of this species from Mr. S. A. Pease of San Bernardino, Cal. Mr. Pease informs us that they were collected out of doors, near a house, in Redlands, and that it was reported to him that they were feeding upon flowers and plants. He also states that he has heard of this same slug in different parts of San Bernardino county.

The specimens sent us are darker than the usual East American form and not so large, the longest individual (preserved in formalin) measuring 58. mm.—PAUL BARTSCH.

NOTICE OF SIX NEW SPECIES OF UNIOS FROM THE LARAMIE GROUP.—By R. P. Whitfield (Bull. Amer. Mus. Nat. Hist., XIX, 1903, p. 483-487). *U. æsopiiformis*, *verrucosiformis*, *retusoides browni*, *percorrugata* and *postbiplicata* are described from Snow Creek, on the Missouri River, about 130 miles N. W. of Miles City, Montana. The names indicate the species of the recent fauna believed to be related to these Laramie forms; but the radial V-like beak-sculpture of at least part of them shows that there is nothing in the supposed relationship of the Laramie forms to any surviving North American Unios. They belong to the *Hyriinæ* of Simpson's arrangement, and are only referable to *Unio* in a Lamarckian sense. The name *Unio browni* Whitf. being preoccupied, that species may be called *Parreysia barnumi*. It is named for Mr. Barnum Brown, who collected the series.—H. A. Pilsbry.



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No 2.

ON THE GENERIC POSITION OF *TEREDO FISTULA* H. C. LEA.

BY CHARLES W. JOHNSON.

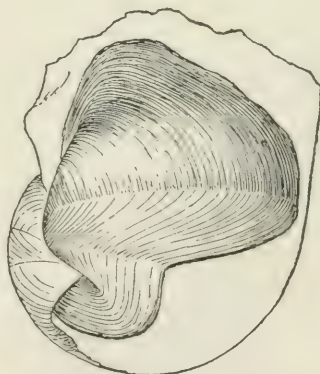
Among the H. D. and W. B. Roger's collection of tertiary fossils of Virginia, now in the Museum of the Boston Society of Natural

FIG. 1.



TEREDINA FISTULA, H. C. LEA.

FIG. 2.



TEREDINA FISTULA, H. C. LEA.

History are five specimens (Catalogue no. 9582) of what is usually referred to as *Teredo fistula* H. C. Lea (Trans. Amer. Phil. Soc., 2

ser., ix 234, pl. 34, fig. 5, 1845). Dr. Dall (Trans. Wagner Free Inst. Sci., iii, pt. iv, p. 813, 1898) suggests that this may possibly be the same as *Teredo calamus* by the same author (op. cit., fig. 4) which apparently differs only in size. The position of *T. fistula* has always been questioned owing to the absence of all shell characters. Among the above-mentioned material is a specimen having a total length of 58 mm. with valves about 12 mm. in length imbedded in the lower end of the tube as shown in fig. 1. From this it will be seen that it evidently belongs to the genus *Teredina*, although I have seen no trace of the tube being separate, and the number of accessory valves are poorly defined, the small, dorsal, triangular space having but a slight median and transverse groove. The valves are divided into three areas by two faint radial lines which interrupt the concentric lines as shown in fig. 2. On the anterior angle near the margin are traces of a fine squamose imbrication over-riding the concentric lines.

A NEW SPECIES OF PLEUROTOMA FROM THE PLIOCENE OF CALIFORNIA.

BY WILLIAM JAMES RAYMOND.

Subgenus *Genota* H. and A. Adams, section *Dolichotoma* Bellardi. *Genota riversiana*, new species.

Shell narrowly fusiform, spire elevated, outline of spire contained within two straight lines; whorls slopingly shouldered, convex anteriorly, slightly concave near the suture, an obtuse angle separating the wider convex area from the narrower concave area, whose widths are in the ratio of five to four; posterior margin of the whorls strongly appressed, suture distinct; first two or three whorls broken away, later whorls with conspicuous, elevated, revolving threads, of which about eight below the shoulder and six above are more prominent, those above somewhat finer and closer; between the primary threads are much finer, secondary threads; on the last whorl about sixteen principal threads below the shoulder, coarser and more widely spaced anteriorly, with one to three secondary threads occupying each interspace; axial sculpture consisting of sharp, elevated growth lines, elegantly decussating the revolving threads,

especially conspicuous just below the suture; on the uppermost of the remaining whorls are faint nodes, about twenty to the whorl; aperture rather narrow; posterior sinus shallow, rounded; lip slightly produced below the sinus, as shown by the growth lines; two-thirds of last whorl broken away; canal rather wide; pillar solid, curved, a somewhat prominent, smooth swelling above; body whorl eroded in front of the aperture, with a wash of callus striated in lines parallel to the lip.

Length of shell 59, of aperture and canal 30, of body whorl 41; max. diam. 20.5 mm. Divergence 30° . These measurements are taken from the broken shell. The spire was probably about 4 mm. longer and the total length of the perfect shell could not have been less than 75 mm., with 7 or 8 whorls. From the Pliocene of Santa Monica, California.

Genota riversiana is the narrowest form of this subgenus found in California. Only an occasional, greatly produced *G. carpenteriana* Gabb can compare with it in this respect. The narrow form, the prominence of the revolving sculpture and the obtuse angle, behind the middle of the whorls, well characterize this species. In *G. cooperi* Arnold and *G. tryoniana* Gabb the angle is sharper and in front of the middle of the whorls. The principal revolving threads in the present species are more conspicuous and more nearly equal than in *G. cooperi*, of which a fine specimen from the Pleistocene of Santa Monica is before the writer. The latter species is the most sharply sculptured of those hitherto described. Form and sculpture at once separate *G. riversiana* from *G. carpenteriana* Gabb, and still more widely from *G. stearnsiana* Raymond, which is the shortest and widest species of the subgenus.

It gives me great pleasure to dedicate this beautiful species to the discoverer, Professor J. J. Rivers, who has made a large and most interesting collection of the Pliocene and Pleistocene fossils found in the vicinity of his home.

The list of subgenus *Genota* will now be as follows:

1. *Genota carpenteriana* Gabb, Late Tertiary to Recent.
2. " *tryoniana* Gabb, Late Tertiary to Recent.
3. " *cooperi* Arnold, Quaternary.
4. " *stearnsiana* Raymond, Recent.
5. " *riversiana* Raymond, Late Tertiary.

It is a very compact group. No. 2 is scarcely more than a variety

of No. 1. The others are well differentiated, yet closely related. No. 1 is the most abundant in numbers; the others are apparently rare.

NOTES ON EASTERN AMERICAN ANCYLI. II.

BY BRYANT WALKER.

In preparing my former paper on this subject (NAUT., XVII, p. 13), I overlooked Hedley's note on *Ancylastrum* (Proc. Mal. Soc., I, p. 118) in which he calls attention to the fact that Bourguignat's type was *A. cumingianus* and not *A. fluviatilis*. The latter species being the type of the genus *Ancylus*, *Ancylastrum*, as used by Clessin and those who have followed him, was wholly unnecessary, being equivalent to *Ancylus s. s.* This rectification leaves the section represented by *A. fluviatilis* and characterized by its elevated, capuli-form shell, with the apex recurved and decidedly posterior, free, as it should be, to be known as *Ancylus s. s.*

The division of the Eastern American species into two sections distinguished by the character of the apex, was only a further step in the direction pointed out by Clessin in establishing his section *Haldemania* and, had his name been available, it would have been used for one of them. Independent of the apical characters, Clessin's group was a valid one, and he was entirely justified in separating it from the Eurasion sections represented respectively by *A. fluviatilis* and *lacustris*. And the fact that both of these species have the apex radiately striate, does not at all militate against the validity of Clessin's *Haldemania*, nor of the two sections that have been proposed to take its place. In order, however, that there may be no confusion hereafter on this point, the description of the section, which includes the Eastern American species with a striate apex, may be amended to read as follows:

Section *Ferrissia* Walker.

Shell conical, ovate, oval or oblong, usually elevated; apex acute or somewhat obtuse, placed only slightly behind the middle of the shell, and usually turned toward the right side, not recurved, radially striate.

Type: *A. rivularis* Say.

Most of the species belonging to this section are by preference in-

habitants of running water, and are usually found on stones, dead shells, etc., in rivers and streams. The smaller, stronger and more compact shell is no doubt the result of their environment. A few species, however, of which *A. parallelus* is the most notable example are to be found on plants or dead leaves in slow-flowing or stagnant water. The distribution of the species seems to be more general than that of the species of *Lævapex*.

I. *Ancylus rivularis* Say (1819). Pl. I, figs. 1-10 and 13-15.

This was the first species of American *Ancylus* to be described and the meagerness of the original description is probably to be attributed to this fact. But one dimension is given and nothing whatever is said in regard to the contour of the shell. It was not until *A. tardus* was differentiated in 1840, that any information was given on the latter subject and then only by inference. The consequent doubt as to what form was really intended to be covered by the description was recognized at an early date. The characteristic difference in the position of the apex and the shape of the shell was first pointed out by Adams (Thomp. Hist. of Vt., p. 164, 1842), and his remarks on the prevalent uncertainty in regard to Say's species are quoted with approval by Haldeman. It was not until the latter in his monograph supplied an accurate description and a good figure, that the species can really be said to have been established. I am inclined to agree with Haldeman rather than Tryon in considering Gould's *rivularis* (Invert. of Mass., p. 224), to be *parallelus* rather than Say's species.

Taking Haldeman's description as the typical expression of the species, *A. rivularis* is a well-marked form, which typically is easily differentiated from all other recognized species. It has a general distribution through the Northern States from New England to Nebraska and southerly to Virginia and through the Ohio and Mississippi Valleys southwest at least as far as New Mexico. I have not seen it, however, from any of the southern Atlantic or the Gulf States east of the Mississippi. It is subject to considerable variation, however, in size and contour, and it is not always easy to differentiate it from the western form of *A. tardus*. It is not likely to be mistaken for any of the other eastern American species, except perhaps *A. haldemani*, which differs in the particulars stated under that species.

(To be continued.)

A DREDGING TRIP TO SANTA CATALINA ISLAND.

H. N. LOWE.

Last October it was the writer's good fortune to spend a week at Avalon, Santa Catalina Island.

A small dredging outfit was included among the baggage. The same dredge had five years ago brought up *Fusus roperi* Dall and *Turbonilla lowei* Dall and previous to that had been used with such good results by the late Edward W. Roper off Eastport, Maine and with what results it was now used the following list will show. As there were numerous small power launches at anchor in the bay, I decided to venture the price of a day's use of a launch and see what strange creatures live in old ocean "a hundred fathoms deep."

I invited to go along as a traveling companion, my young friend, John Paine, for whom at my request Dr. Dall has named two of the new species dredged.

The morning selected was clear and bright and the water smooth as glass as we steamed up the island till just off "Moonstone Beach" and under the lee of "Long Point." Here we decided to make our first haul in some 30 fathoms of water.

The water was so transparently blue that we could see our dredge as it sank down, down into the realms of Mermaids and sea-serpents.

Anyone who has done any dredging well knows we did not take along any rocking chair or wear our Sunday clothes.

After the dredge had been down a reasonable length of time we commenced hauling in our thousand feet of dripping rope, by no means an easy task. Almost every haul would be different, sometimes the dredge would be entirely filled with soft mud or sand, again with broken shells, and twice it came up filled with small stones to which beautiful bunches of Brachiopods were attached.

The second day we dredged in somewhat deeper water up to fifty fathoms with very good results.

After my return it took every evening for over three weeks to sort over the dredgings with the aid of a strong lens.

Dr. Dall has kindly worked up the doubtful material and described the new species, in the Proceedings of the Biological Society of Washington, Dec. 13, 1903, pp. 171-176.

The following is a full list of the species dredged :

Actæon punctocæolata Cpr.
Actæon painei Dall. n. sp.
Actæon traski Stearns.
Admete gracilior Cpr.
Amphissa undata Cpr.
Amphissa versicolor Dall.
Angulus carpenteri Dall.
Bittium asperum Cpr.
Cadulus fusiformis P. & S.
Cæcum crebrecinctum Cpr.
Callista newcombiana Gabb.
Callista (Clementia) subdiaphana
 Cpr.
Cancellaria cooperi Cpr.
Cardium biangulatum Sby.
Cardium quadriganarium Conr.
Calliostoma splendens Cpr.
Callisotoma variegatum Cpr.
Protocardia centifilosæ Cpr.

Only one adult specimen of this beautiful shell.

Capulus californicus Dall.
Cavolina pacifica Dall.
Chama exogyra Conr.
Clathurella lowei Dall. n. sp.
Cerithiopsis tuberculata Cpr.
Cerithiopsis assimilata Cpr.
Conus californicus Hds.
Columbella carinata Hds.
Columbella tuberosa Cpr.
Crepidula navicelloides Nutt.
Crenella columbiana Dall.
Chama muricata Hds.

Two examples had unusually long, incurved spines.
Cuspidaria obesa Lov.
Daphnella clathrata Gabb.
Dentalium neohexagonum S. & P.
Diplodonta orbella Gld.

Drillia cancellata Cpr.
Drillia empyrosia Dall.

Adult shells very rare.

Erato columbella Mke.
Erato vitellina Hds.
Eulima rutila Cpr.
Fusus ambustus Gld.
Fusus kobelti Dall.

Fine large specimens.

Hinnites giganteus Gray.
Ischnochiton biarcuatus Dall. n. sp.
Ischnochiton interstinctus Gld.
Ischnochiton punctulatissimus Cpr.
Kellia suborbicularis Mont.
Kellia laperousi Deshayes.
Lucina annulata Rev.
Lucina approximata Dall.
Lucina californica Conr.
Lucina nuttalli Conr.
Laqueus californica Koch.

Found in large bunches attached to stones, dead shells and ascidians.

Laqueus jeffreysi Dall.

Found with *L. californicus*, rare.

Leda acuta Cpr.
Leda hamata Cpr.

A few live specimens of this interesting species.

Lepidopleurus crebricostatus Cpr.
Lepidopleurus mertensi Midd.
Leptochiton nexus Cpr.
Lima orientalis Cpr.
Limatula subauriculata Mont.
Lingula albida Hds.
Lunatia draconis Dall. n. sp.
Lyonsia californica Conr.
Macromphalina californica Dall.

Mangilia densistriosa Cpr.
Mangilia fancheræ Dall.
Mangilia sculpturata Dall.
Metzgeria californica Dall.
Mitra maura Swains.
Mitra lowei Dall. n. sp.
Modiola polita Verrill.
Murex californicus Dall.
Murex painei Dall.
Muricidea incesso Brod.
Muricidea santarosana Dall.
Nassa insculpta Cpr.

And a var. with heavy ridges.
Nassa perpinguis Hds. var.
Natica russa Gld.
Neæra californica Dall.

Occasional examples of this curious shell.

Nucula belloti A. Ads.
Ocenebra lurida Midd. var.
Odostomia amianta D. & B.
Odostomia kennerleyi D. & B.
Opalia retiporosa Cpr.
Ovulum Sp.

Two fine specimens dredged.
Pandora bicarinata Cpr.
Pachypoma inæquale Martyn.
Pecten floridus Hds.
Pecten hericeus Gld.
Pecten latiauritus Conr.
Pecten vancouverensis Whiteaves.
Phasianella compta Gld.
Placiphorella velata Cpr.
Pleurotoma carpenteri Gabb.
Pleurotoma perversa Gabb.
Psephidea ovalis Dall.
Puncturella cucullata Gld.
Puncturella galeata Gld.
Ranella californica Hds.

The adult specimens dredged

were only half the size of those found on the mainland yet were twice as thick and heavy.
Scala crebrecostrata Cpr.
Scala bellastrata Cpr. var.
Scala sawinæ Dall. n. sp.
Saxicava rugosa L.
Semele pulchra Mtz.
Sistrum carbonarium Sby.
Tegula peramabilis Cpr.
Thracia plicata Cpr.
Terebratella obsoleta Dall.
Terebratella occidentalis Dall.

Several fine large specimens of these most beautiful brachio-

pods.
Tornatina culcitella Gld.
Trophon stuarti var. *smithi* Dall.
Trophon tenuisculpta Cpr.
Trophon triangulatus Cpr.
Turitella cooperi Cpr.
Turbonilla lowei D. & B.
Turbonilla simpsoni D. & B.
Turbonilla hypolipsa D. & B.
Turbonilla hypolipsa var. *stylina* Cpr.
Turbonilla auricoma D. & B.
Turbonilla aresta D. & B.
Turbonilla tridentata var. *catalinensis* D. & B.
Turbonilla aurantia Cpr.
Turbonilla eucosmobasis D. & B.
Turbonilla latifunda D. & B.
Turbonilla torquata Gld.
Trachydermon flectens Cpr.
Trivia ritteri Raymond.
Venericardia ventricosa Gld.
Verticordia ornata Orb.
Volvula cylindrica Cpr.
Williamia peltoides Cpr.

NOTES ON A FEW SHELLS.

BY C. F. ANCEY.

Prof. H. A. Pilsbry has described and figured a few years ago (Proc. Acad. Nat. Sciences, Phila., 1901, p. 632, pl. xxxvi, fig. 30-41) a Japanese *Clausilia* which he called *Cl. oscariana*, in honor of Dr. Oscar Boettger, the well-known German writer on *Clausilia*. He was probably unaware that a Chinese species of this genus received the same name from P. V. Gredler (Zur Conchylien-Fauna von China. xvii Stück, Wien, 1892, p. 8), who, curiously enough, has dedicated his species to Dr. O. von Möllendorff whose Christian name is Otto not Oscar. At all events, the name *Oscariana* cannot stand for the Japanese *Clausilia*, this homonym having several years of priority. Hence, I propose to substitute for it the name *Clausilia pilsbryana* Anc.

I must also call attention to *Claus. oscari* Thiesse (Bttg., Proc. Zoöl. Soc. 1883, p. 34, fig. 16) a somewhat distinct form of *Cl. schuchii*, v. Voith, perhaps entitled to specific rank, though Dr. Westermund (Fauna der in der Paläarktischen region lebenden Binnen-Conchylien, iv, p. 140) calls this a variety of *Cl. schuchii*.

Terebra histrio Desh., was described (Journ. de Conch. 1857, pl. iv, fig. 11) without a locality, from a specimen in Deshayes' collection. I have procured a fine specimen collected on the coast of Senegal together with *T. bitorquata* Desh., already known as West African, *Drillia rosacea* Reeve, *Marginella petiti* Duval, *M. goodalli* Sow., *M. cleryi*, Petit. My example, consisting of 16 whorls, is 42 mill. long and 10 mill. wide. For the identification I am indebted to Mr. Ph. Dautzenberg.

Natica prietoi Hidalgo (Journ. Conch. xxi, p. 332, Moll. Esp., pl. 20B, figs. 2-3), a very rare shell, discovered on the coast of Southern Spain, was found again by myself at Algiers. I secured a large, somewhat worn example and a smaller one very perfect. With this I detected a specimen of another scarce species worthy of record, viz., *Scalaria candidissima*, Monterosato.

Drymæus nubilis Preston, of which I have purchased a specimen from the author, who described it in the "Journal of Malacology," vol. x, no. 1, March 1903, appears to be absolutely the same as *Drymæus reclusianus* Pfr., var. *martensianus* Pils., from Costa Rica, which of course has the priority.

Helicina pterophora Sykes (Proc. Malac. Soc. of London, vol. v, no. 1, 1902, p. 20, fig.), from Guatemala, appears not to differ essentially from *H. oxyrhyncha* Crosse and Debeaux, from unknown locality. The shells labelled *oxyrhyncha* in the collection of the British Museum, from Bonacca Island, Honduras, are hardly referable to this species, hence, I suppose that Mr. Sykes has been misled in considering his species *pterophora* as distinct from the true *oxyrhyncha*. An example of the latter in my collection is quite typical, lacking the colored bands of *pterophora* and uniform yellow.

NOTES AND NEWS.

SNAILS AND SLUGS IN THE NEW INTERNATIONAL ENCYCLOPEDIA.—In *The Dial* (Chicago) of Nov. 16, 1904, I took occasion to set forth the character of some of the articles on scientific subjects found in the most recent Encyclopædias. The article "slug" was examined in a number of them, with interesting results. I said, however, "the 'New International' and the 'Encyclopædia Americana' have not yet reached the letter S, so we cannot tell what surprises they have in store for us." The former of these has now come to S, and to-day I turned with interest to "slug." The common *Agriolimax campestris* appears as "*Lima campestris*" though one would think a campestrian *Lima* might find it difficult to exist! We are also told that slugs are "vegetable eaters," without qualification. Turning over the article "snail," I find a colored plate of American snails. The generic nomenclature is almost pre-historic, "*Helix*" covering three different families, not to speak of genera. Thus we have *Helix fuliginosa*, *Helix alternata*, etc. We also have *Bulimus dealbatus* and *Bulimus fasciatus*.

Now all this is stupid enough, and it seems fitting for those who

know better to agitate the matter sufficiently to bring about a reform, if that is possible.—T. D. A. COCKERELL.

A NEW COLLECTOR IN THE FIELD.—A few days ago I noticed in my garden, where a Chipmunk (*Tamias striatus* Linne.) had been "cleaning house" for the spring, the only refuse he had brought out was about a pint of empty shells, consisting of two species, about an equal number each, *Polygyra monodon* Rack. and *Succinea avara* Say. With the Polygyras the upper half of the shells were eaten away and then nicely cleaned of the animal, the Succineas all had the animal cleanly taken out without breaking the frail shell in the least. The Succineas are every season very plenty within fifty feet of Mr. Chipmunk's abode, and the *P. monodon* is the predominating species of the genus in this locality, Des Moines, Iowa.—T. VAN HYNING.

Messrs. Walker, Clapp and Henderson have made a short collecting trip in the Blue Ridge of Virginia. They report a small catch.

ADDITIONAL NOTES ON LIMAX MAXIMUS L. IN CALIFORNIA.—It may be appropriate to add to Mr. Bartsch's note on the occurrence of *Limax maximus* L. in California, that the Academy of Natural Sciences of Philadelphia has received this species from the following additional places in that state: Oakland, collected by Messrs. Williard Wood and F. L. Button in 1896; Los Angeles, Dr. R. E. C. Stearns, collected April 9, 1901; Monterey Co., Mr. Geo. H. Clapp; San Jose, collected by Mr. O. P. Jenkins in 1902; and also from Pasadena, Oct. 1896 and Long Beach in 1899, collected by Mr. H. N. Lowe.—E. G. VANATTA.

NOTE ON VENUS ARAKANA Nevill.—In the Proceedings of the Malacological Society for Oct., 1903, Mr. Smith has correctly referred *Venus malonei* Vanatta to Nevill's species, but at the same time he has added a new name to the synonymy by calling it *V. "arakanensis."* The brothers Nevill did not describe this shell as "*Venus (Timoclea) arakanensis*," as quoted by Mr. Smith. They

called it "*Cryptogramma arakana*." The correct form is used by Sowerby, on p. 33 of his Supplement to Marine Shells of South Africa.—H. A. PILSBRY.

A DISTORTED OYSTER.—The most curious distortion that I have seen was handed to me by a parishioner a few days ago. The species is the common oyster taken from the Sound here (Branford, Conn.) The earlier growth is $4\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches wide, the shell then shoots off to the right at an angle of 100° and continues $2\frac{1}{2}$ inches with a width of 2 inches. It next turns to the left at an angle of 120° and adds 2 inches more. This is the external appearance—Owing to the fact that in each case the animal abandoned a part of the shell and built from the middle, the internal appearance is a double curve.—HENRY W. WINKLEY.

PUBLICATIONS RECEIVED.

SYNOPSIS OF THE GENERA, SUBGENERA AND SECTIONS OF THE FAMILY PYRAMIDELLIDÆ.—By Wm. H. Dall and Paul Bartsch (Proc. Biol. Soc. Wash. XVII. pp. 1-16, Feb. 5, 1904). The family consists of four genera *Pyramidella*, *Turbonilla*, *Odostomia* and *Muschisonella*. The former is divided into 20 subgenera for 10 of which new names are proposed. *Turbonilla* consists of 12 subgenera of which five are new, and *Odostomia* 37 subgenera, eight of which are new. Four new species are described viz.—*P. dodona*, *T. archeri*, *O. pilsbryi* and *O. americana*. An elaborate system of subgenera and sections is proposed for the wonderfully varied and numerous forms of this difficult family. The work has long been needed, and when suitably illustrated will be of great utility.—C. W. J.

A LIST OF SHELLS COLLECTED IN WESTERN FLORIDA AND HORN ISLAND, MISS.—By E. G. Vanatta (Proc. Acad. Nat. Sci., 1903, pp. 756-759). The 119 species enumerated were collected by Mr. Clarence B. Moore, while engaged in archaeological researches. *Vitrinella mooreana*, *Erycina floridana* and *Cuna dalli* are described as new.—C. W. J.



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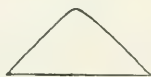
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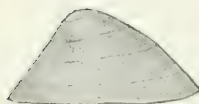
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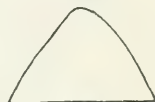
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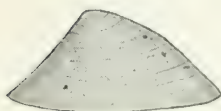
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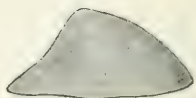
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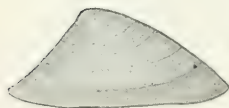
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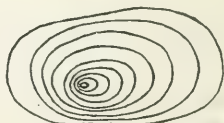
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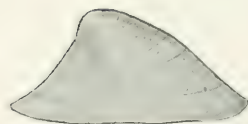
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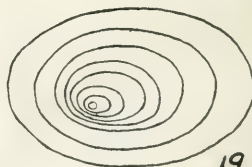
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THE NAUTILUS.

VOL. XVIII.

JULY, 1904.

No 3.

NOTES ON EASTERN AMERICAN ANCYLI. II.

BY BRYANT WALKER.

Ancylus rivularis Say. Pl. I, figs. 1-10, 13-15.

The typical form as established by Haldeman is represented by fig. 3 (the specimen figured agreeing almost exactly with his dimensions), and is an ovate, moderately elevated shell with a subacute apex, which is inclined toward the right side, and with about one-third of the shell posterior to it. The anterior and dextral slopes are regularly but not strongly convex; the posterior slope is quite concave immediately below the apex, but becomes nearly straight toward the peritreme; the left slope is nearly straight, sometimes slightly concave towards the apex. The lines of growth are well marked but quite irregular, and there is more or less of a tendency to the radial rippling on the anterior slope so common in many species. The shell is distinctly narrowed toward the posterior extremity, the greatest width being just in front of the apex. Associated with the specimen figured, and grading into it, is a more depressed form, with the apex less prominent and the posterior slope nearly straight (fig. 4). Similar examples have been supplied from several localities in the neighborhood of Buffalo, N. Y., and indeed it seems to be rather the characteristic form of that region. The few examples seen from eastern Massachusetts are smaller and rather more depressed than the typical form.* Western specimens appar-

* The "large specimens" from Caribou, Me., quoted by Nylander (NAUT., xiii, p. 105) should, I think, be referred to *A. parallelus*.

ently average larger than those from the Eastern States. The largest examined are from Lincoln, Neb., one of which is represented by fig. 6, which has the apex more obtuse than others from the same lot. A series submitted by Dr. Sterki, from Ohio, are uniformly of medium size, none of them attaining the dimensions of specimens from Michigan and further west. Fig. 9 represents another western form, larger, proportionately higher and with the anterior slope more convex than in the typical form, and which in the longitudinal outline approaches the western form of *tardus*, and not infrequently is very difficult to differentiate from it, while fig. 13 represents an extreme form, unusually high, with nearly straight lateral slopes and a very acute apex.

While as a rule it is not difficult to separate this species from *tardus*, and on the whole the two species seem sufficiently distinct, it is by no means always easy to decide in regard to individual cases or even large series. This has been particularly true in regard to the series from Ohio, received from Dr. Sterki, in which the two forms seem to run together almost inextricably. As shown by the figures given of each species, none of several distinctive characters relied on are invariable, the posterior slope is frequently quite as concave in *tardus* as in *rivularis*, while the convexity of the anterior slope is not uncommonly quite as great in the one as in the other, and neither the position of the apex nor the outline of the peritreme is an absolutely invariable character. The most that can be said is, that while typically the two forms are quite distinct, and in the main can be readily distinguished, nevertheless the variation is so great that, as is often the case with all the fresh-water groups, the supposed specific characters fail to give an infallible basis for determination, and the decision in such cases must be the result of the individual opinion of the observer based upon his general conception of the species as applied to the particular specimens in question.

Taking this species as a whole, it may be said to be distinguished from *tardus* by larger size, more depressed form, more acute apex, which is more inclined toward the right side, and nearer the centre (longitudinal) of the shell, the posterior slope is proportionately longer and more oblique, the anterior slope is usually not so convex, the left slope is usually longer and more convex than the right, the shell is usually decidedly wider anteriorly and the transverse section is wider in proportion to its height, and the side lines consequently

more oblique. This last specification is perhaps a more reliable distinction in doubtful cases than any of the others. Occasionally depressed specimens occur in which both of the side slopes are decidedly concave, and the apex quite papilliform. This form, however, seems to be an individual rather than a racial peculiarity.

The dimensions of the specimens figured are as follows :

No.	Length.	Breadth.	Altitude.
1	4.75	3.00	1.50 Min.
3	5.25	3.50	2.00 "
6	7.00	4.00	2.50 "
9	6.25	4.25	2.00 "
13	6.50	4.33	2.75 "

Var. *brunnea* Hald.

I have been unable to get any information whatever in regard to this form.

II. *Ancylus tardus* Say (1840). Pl. I, figs. 11, 12, 16-23. Pl. II, figs. 1-22.

Say differentiated this species from his *virularis* on three grounds :

1. The apex inclined backwards, but not laterally.
2. The straight posterior slope.
3. The oval aperture, not distinctly narrowed at one end.

His type came from the Wabash. But two dimensions are given, length $\frac{3}{20}$, breadth $\frac{1}{10}$ in. (3.75 x 2.5 mm.). Binney errs in quoting the length as 4.25 mm. He also states that the type is in the collection of the Philadelphia Academy. Among the *Ancylus* received from the Academy is a single specimen (No. 58045) labelled "Wabash River, Mrs. L. W. Say," which is undoubtedly the specimen referred to. As shown by the figure (Pl. II, fig. 1), the posterior margin is somewhat broken. Its present dimensions are exactly those given by Say (3.75 x 2.5). It is a dead, somewhat worn, shell, and the defective peritreme might easily have escaped observation. When perfect, it must have been somewhat larger.

Adams (Thompson's Hist. of Vt., 1842), was next to recognize the species, which he says differs from *virularis* in the position of the apex and shape of the aperture. His dimensions (6.25 x 4 x 3.25 mm.) indicate a much larger shell, proportionately a little wider and very much higher than the type.

Haldeman's descriptions (Mon., 1842), though short, when read in connection with his description of *rivularis*, clearly differentiate the form indicated. His figure was evidently drawn from the broad form found in eastern Pennsylvania, and which justifies his remark that *tardus* is proportionately broader than *rivularis*, when understood as applying to the outline of the peritreme and not to the transverse section. His dimensions, however, are quoted from Adams.

Neither Binney, Tryon nor Clessin, have added anything to our knowledge of this species.

I have not been able to find a specimen that agrees either actually or proportionately with the dimensions given by Adams, which indicate a large, narrow and very high form. Western specimens of the same length are uniformly wider and lower. The only Vermont specimens seen are a pair in the collection of the Philadelphia Academy labeled "Vermont," and a small suite of immature examples from Hartland (No. 58036) (pl. II., fig. 7). The former are quite typical in their longitudinal and transverse outlines, but are very wide, almost sub-circular in shape (4.5×3.5 and 4.25×3). The latter are similar, but more depressed. Similar specimens, intermediate in elevation (pl. II., fig. 4), have been found at Orono and in the Aroostook River in Maine. In all these the posterior slope is straight. An elevated form (pl. II., fig. 10) similar to the Vermont shells occurs at Silver Spring and Columbia, Pa., and is very like that figured by Haldeman; the posterior slope, however, is more oblique, and in some examples noticeably concave (pl. II., fig. 12). All these shells, however, are alike in the comparatively small size and great width, and should a larger suite show that this is the prevalent eastern form of the species it should probably be distinguished varietally. The western, and no doubt the typical, form is quite different. Larger, narrower and higher, it is typically a well-marked form. The resemblance between Say's type (pl. II., fig. 1) and the upper half of fig. 20, pl. II., is very striking, and I have no doubt but that Say's specimen is an immature example of this common western species, which is found abundantly from Ohio west to the Mississippi Valley. It is, however, quite variable, as shown by the figures, and, as already stated, at times very difficult to differentiate from the equally variable forms of *rivularis*. The typical western form is represented by figs. 17 and 20, pl. II., and is characterized by its regularly oval outline, elevated obtuse apex, which is scarcely

turned from the median line, and steep, nearly straight lateral slopes. The anterior slope is usually more decidedly convex than in *rivularis*, and the posterior slope, though frequently quite concave, is shorter, more direct and less oblique than in that species. The variations in contour leading towards *rivularis* are shown by figs. 11, 16, 18, 20 and 22 on plate I. An unusually narrow form (pl. II., fig. 14) occurred sparingly among the material supplied by Dr. Sterki.

The dimensions of the specimens figured are as follows :

	<i>Length.</i>	<i>Breadth.</i>	<i>Alt.</i>
Plate I., fig. 11 . . .	5.75	3.75	2.00 mm.
“ “ 16 . . .	6.00	3.80	2.25 “
“ “ 18 . . .	5.20	3.50	2.00 “
“ “ 20 . . .	5.00	3.25	2.25 “
“ “ 22 . . .	6.00	4.00	2.50 “
Plate II., fig. 1 . . .	3.75	2.50	1.75 “
“ “ 4 . . .	4.25	3.25	1.50 “
“ “ 7 . . .	4.25	3.00	2.00 “
“ “ 10 . . .	4.75	3.00	2.00 “
“ “ 12 . . .	4.25	3.00	1.90 “
“ “ 14 . . .	5.00	2.75	2.00 “
“ “ 17 . . .	5.50	4.66	2.50 “
“ “ 20 . . .	5.66	3.50	2.50 “

EXPLANATION OF THE PLATES.

All the figures are drawn on the same scale.

Plate I.

Figs. 1-5	<i>A. rivularis</i> Say.	Erie Canal, N. Y.
Figs. 6-8	“ “ “	Lincoln, Neb.
Figs. 9-10	“ “ “	Lamberton Creek, Kent Co., Mich.
Figs. 11-12	<i>A. tardus</i> Say.	“ “ “ “
Figs. 13-15	<i>A. rivularis</i> Say.	“ “ “ “
Figs. 16-23	<i>A. tardus</i> Say.	“ “ “ “

Plate II.

Figs. 1-3	<i>A. tardus</i> Say.	Wabash River.
Figs. 4-6	“ “ “	Orono, Me.
Figs. 7-9	“ “ “	Vermont.
Figs. 10-11	“ “ “	Silver Spring, Pa.

Figs. 12-13	<i>A. tardus</i> Say.	Columbia, Pa.
Figs. 14-16	" " "	Tuscarawas River, Ohio.
Figs. 17-19	" " "	Plaster Creek, Kent Co., Mich.
Figs. 20-22	" " "	Rockford, Ills.

A NEW OMPHALINA FROM ALABAMA.

BY GEO. H. CLAPP.

Omphalina pilsbryi n. sp.

Shell about the size and general contour of *O. fuliginosa*; umbilicate, color rich reddish-chestnut with a dull satiny luster above, smoother and more polished below. Striae of growth fine and close, crossed by microscopic granules in spiral series like beads, giving the upper surface a dull luster; below the granules are obsolete and the surface polished. Apex *smooth*, and in all adult specimens seen denuded of the epidermis. Whorls $5\frac{1}{2}$, rather flattened and slowly increasing, the last whorl very much wider, more than double the width of the preceding one, almost round, no flattening on the base. Aperture oblique, circular. No thickening at the lip, which is darker than the balance of the shell.

Greater diameter 27, lesser $23\frac{1}{2}$, altitude $17\frac{1}{2}$ mm. Oblique height of aperture 14, width 14 mm.

Greater diam. 24, lesser 21, alt. 14.5 mm.

On hillsides in woods around Wetumpka, Ala. Collected by Herbert H. Smith.

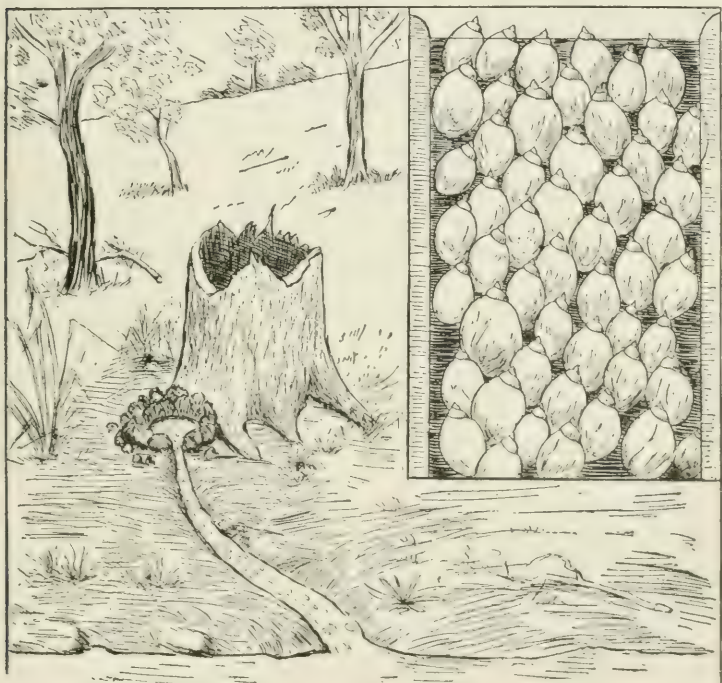
From above this shell has much the appearance of the large granulated variety of *O. laevigata* found with it, but it lacks the close ribs of that species, and the embryonic whorls are *smooth*, while in *laevigata* they are *sharply ribbed*. On the base the resemblance is less striking, as *laevigata* has a very small umbilicus, the base is flattened, and the internal white thickening makes the base several shades lighter than the upper surface.

This is one of the finest of the *Omphalinas*, and while it is quite common around Wetumpka, it appears to have been entirely overlooked by collectors. I take great pleasure in naming it after Dr. H. A. Pilsbry, who is doing so much to clear up the dark places in American Conchology. Type in my collection, and cotypes in the collections of the Academy of Natural Sciences, National Museum, etc.

A MOLLUSCAN STAMPEDE.

BY T. VAN HYNING.

In the summer of 1899, while collecting shells in the vicinity of Des Moines, Iowa, I made an observation which has seemed to me to be of more than ordinary interest. Along the margin of a bayou, adjacent to the Des Moines river, I discovered what was quite apparently an old, abandoned cray-fish hole beside an old stump. Clear,



cold spring water was bubbling up from within the hole, overflowing and running down the slope about ten feet to the bayou. All the way up the little stream, from the bayou to the hole, *Physa gyrina* was very numerous and in all stages of development, from very minute young ones up to well-developed adults. All were headed up-stream and moving slowly towards the hole. Around the margin of the hole, and down in it as far as I investigated, about fourteen inches, the surface or wall of the hole was covered with them one

layer deep as tightly as they could possibly be crowded together, all headed downward. All in the hole were adult specimens. The lateral ones had wedged themselves in underneath the ones forward of them until they were seemingly forced to the bottom of the hole, and there became an immovable mass, as there would be no other way of escape but to back out, which the lateral ones were not inclined to do, but on the other hand were anxious to go ahead. With the water bubbling up through the space left in the center of the hole, the shells had become very smooth and shining. With a stick I dug down about fourteen inches and gathered about a pint of shells from the walls, and a great number fell down the hole. I do not know how much further it extended as it filled with dirt and shells from my interruption. About a month later I returned to get some of the water for analysis, but it had ceased to flow and dried up; recently dead shells were very plenty all around. I scraped up a cigar-box full more of them. My impression would be that the water, either from its cool temperature or some appetizing ingredient, was the attraction. I have been sorry ever since that I did not give it more thought at the time. The figure in the upper right-hand corner, while not artistic, serves to show the manner in which the shells were adhering to the walls of the hole; the density of the mass is not over-illustrated in the least, if any difference they were even more tightly arranged than illustrated; there was not a space in which a shell could possibly move.

DESCRIPTIONS OF NEW JAPANESE LAND SNAILS.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota (Euhadra) irredidiva n. sp.

Shell umbilicate, resembling *E. mercatoria*, but very much more depressed. Sculpture of fine growth-lines, minute scattered papillæ, and densely crowded, very fine spiral striæ; the surface rather glossy. The specimens are fossil and have lost color except a dull reddish band above the periphery and sometimes another below it. Whorls 5, the apical one rather large, the last whorl double the width of the preceding, slightly subangular in front, only a trifle descending to the aperture. The aperture is oblique, wide and low, the upper and basal margins subparallel; lip reflexed and recurved, the basal lip noticeably straightened. Alt. 21, diam. 36 mm.

Okinoerabushima, Osumi. Type no. 87335 A. N. S. P., from no. 1250 of Mr. Hirase's collection.

The most depressed member known of the *mercatoria* group, and requiring comparison with no other species. It has been found only as a fossil, probably quaternary, and is the first land snail to be described from the island.

Eulota (Aegista) tokunoshimana n. sp.

Shell openly umbilicate, depressed with convexly conic spire, thin but rather strong, reddish brown, the spire a little paler. Surface dull, densely covered with minute short scales or the papillae left after the loss of scales. Whorls 7 to $7\frac{1}{2}$, convex, very closely coiled, the last descending a trifle in front, barely perceptibly angular in front, elsewhere rounded, especially beneath. The aperture is rather small, oblique, lunate, the narrowly expanded and slightly thickened lip forming about three-fourths of a circle.

Alt. 14.3, diam. 21, width of umbilicus 5 mm.

Alt. 14, diam. 21.5, width of umbilicus 4 mm.

Alt. 13.5, diam. 18.5, width of umbilicus, 4 mm.

Tokunoshima, Osumi. Type no. 87334 A. N. S. P., from no. 1210 of Mr. Hirase's coll.

A peculiar, compact and high-spired *Aegista*, with more the sculpture of *Plectotropis*.

Eulota (Plectotropis) pressa n. sp.

Shell openly umbilicate, depressed, low-conic above, convex below the rather acute peripheral carina; thin, dull brown. Surface somewhat shining, finely striate, the striae irregular, but not scaly. Whorls $5\frac{1}{3}$, the last hardly descending in front. Aperture small, oblique, the upper margin straightened, hardly expanded, lower margin narrowly expanded, slightly reflexed, thin, and deeply arcuate. Alt. 6.2, diam. 10.8, width of umbilicus 3.2 mm.

Okinoshima, Tosa. Types no. 87336 A. N. S. P., from no. 1181 of Mr. Hirase's collection.

A small, plain species, with the spire higher than in *E. intonsa*, and the last whorl narrower.

Eulota (Aegista) friedeliana var. *vestita* n. var.

Differs from *E. friedeliana* by being very densely covered with minute short scales. Alt. 9, diam. 16.5, width of umbilicus 5 mm.

Oshima, Osumi. Types no. 87338 A. N. S. P., from no. 1199 of Mr. Hirase's collection.

Eulota friedeliana var. *goniosoma* n. var.

More widely umbilicate and more depressed than *friedeliana* or var. *peraperta*. Whorls $5\frac{1}{2}$, the last bluntly angular at the periphery. Surface covered with short triangular cuticular scales, or their short solid bases. Alt. 8.5, diam. 19, width of umbilicus 7 mm.

Shimo-Koshikijima, Satsuma. Types no. 87337 A. N. S. P., from no. 1238 of Mr. Hirase's collection.

Eulota (Aegista) kobensis var. *pertenuis* n. var.

Shell very thin, very openly umbilicate, the spire very low; nearly planorboid. Lightly striate. Whorls 5, the last very slightly descending in front. Peristome expanded, *thin*, not thickened within. Alt. 6, diam. 15 mm., width of umbilicus 5.5 mm.

Irazuyama, Tosa. Types no. 87340 A. N. S. P., from no. 1098a of Mr. Hirase's collection.

Eulota (Aegista) kobensis var. *koshikijimana* n. var.

Shell rather thin, nearly planorboid, chestnut-colored; surface dull, densely, finely and sharply striate. Whorls $5\frac{1}{2}$, the last somewhat descending in front. Peristome expanded, narrowly reflexed, flesh-colored, only slightly thickened within. Alt. 6.5, diam. 15, width of umbilicus 5.3 mm.

Shimo-Koshikijima, Satsuma. Types no. 87341 A. N. S. P., from no. 1241 of Mr. Hirase's collection.

This is quite a distinct form by its thin lip and minutely lamellose cuticle.

The four *Aegistas* described above would probably be treated as species by many Helicologists, but their relationships are, we think, better shown by connecting them with the allied forms.

LIMAX MAXIMUS AND OTHER SLUGS IN CALIFORNIA.

BY ROBERT E. C. STEARNS.

The occurrence of *Limax maximus* at Redlands, as reported by Mr. Bartsch in the May number of the NAUTILUS, carries this form farther inland and to a higher altitude than heretofore known on the

West coast, at least in California, the general locality being over fifty miles from the sea, and the elevation over 1300 feet or more. Mr. Bartsch remarks that his specimens were "darker than the usual East American form, and not so large, the longest individual (preserved in formalin) measuring 58 mm." This slug is said to occur "in different parts of San Bernardino county."

In point of size, examples 75 mm. or more are not infrequent. Dr. Pilsbry, commenting on specimens sent to him a year or two ago, said "that it was not the common form, but a melanistic variety which I have never seen from the East." Hereabout there is considerable variation in this respect; occasionally individuals are met with that are much darker than any of those sent to him at that time.

In some places this slug has already become a pest. In my grounds I have not found that it does any material damage to flowers or plants, quite unlike *Helix aspersa* in this matter. It seems to prefer the vicinity of the garbage can, which it exploits after dark, being nocturnal in its wanderings, concealing itself in cool, damp, dark or well-shaded places during the day. A greasy, cast-away soup-bone is apparently to its liking, judging by the numerous slime-tracks centering around such an object. It frequently invades human habitations, directing its visits to the pantry. It is surprising how small a hole or narrow crack even the largest individuals can pass through. In order to keep them out, especially of the pantry and porches, ordinary table salt in liberal quantities strewn around and close to the threshold, inside and outside of the pantry and kitchen doors, and other places indicated by the shiny slime-tracks as points of entrance, will do these pests up every time; the salt adheres to their sticky bodies, dissolves and is absorbed, and the intruders are literally corned to death. For all places about the dwelling-house, salt is the safest and most effective article. Air-slaked lime that has not lost all of its heat is also good. This should be used freely in cellars and basements, and other places of concealment where the slugs occur. Another remedy, excellent, but too poisonous to be used unless safely placed out of the way of children or pet animals, is made by taking the refuse of the soup-kettle, adding water so as to make when stewed a gruel of the consistency of molasses; mix with it, after straining out the coarser portion, some Paris green; daub pieces of board or old shingles with some of the mixture, and place near such spots as are indicated by the tracks. This prescription is a settler.

Having experimented successfully with these "remedies," I can assure satisfactory results. Of course trapping under pieces of board placed here and there, turning the same occasionally and collecting by hand, may be practised with more or less success.

In England, in wet, cool seasons, slugs are particularly destructive to fields of young wheat; there they work at night. Lime is used to a great extent, and trapping under cabbage and other large leaves is often resorted to. Soot is sometimes used in the wheat fields in the same way as lime.

Another foreign slug *Limax* (*Amalia*) *hewstoni* (= *A. gagates*?) had become a nuisance in the grass plots of San Francisco twenty years ago, and has presumably extended its territory over a larger area by this time. Our large native slugs, *Limax* (*Ariolimax*), *columbianus* Gld., and its near relative *californicus* Cp., inhabitants of Central California, the first-named found also as far north as British Columbia, appear to be free of the sins which have made the foreign forms obnoxious. These two species are sometimes met with of the length of six inches. Their dirty yellowish green color, often blotched or spotted, is rather repulsive. It is not unlikely that slugs may become a serious pest to the farmers in some parts of California at some future time, an unwelcome incident pertaining to the development of irrigation.

The sense of smell seems to be highly developed in *L. maximus*, and probably in all of the slugs, and again, the sense or instinct of direction. *L. maximus* is the only species that I have had an opportunity to observe in this connection. The slugs are "not popular with the masses;" and very good people call them "nasty things."

Los Angeles, Cal., June 13, 1904.

NEW MOLLUSCAN GENERA FROM THE CARBONIFEROUS. By George H. Girty (Proc. U. S. Nat. Mus. xxvii, 1904). *Limipecten* is a new genus of *Pectenidæ* based upon a Texan species, *L. texanus* n. sp. Its relations with *Ariculipecten* and *Acanthopecten* are fully discussed. *Pleurophorella* is a new group near *Allerisma*, type *P. papillosa*, Young Co., Texas. *Clavilites* is a new genus of *Dentaliidae*, annulate like *Plagioglypta*, but having a dorsal ridge over which the ribs pass with a strong anterior bend. Type *C. howardensis*, from Kansas. *Schuchertella* n. gen. is a Brachiopod group formerly called *Orthothetes*, but not *Orthotetes* of F. de Waldheim.

THE NAUTILUS.

VOL. XVIII.

AUGUST, 1904.

No 4.

LIST OF ALABAMA SHELLS COLLECTED IN OCTOBER AND NOVEMBER, 1903.

A. A. HINKLEY.

For several years I have been interested in the variations and geographical distribution of the family *Pleuroceridae* of our fresh water shells. Under the same environments a species will often show considerable variation, while specimens from widely different stations will show very marked differences which are often confusing in the determination of species. This has been one cause of the large synonymy of this group.

Last fall I had the pleasure of a short visit to several of the streams from Decatur to Montgomery, Alabama. At Decatur, a stop between trains did not allow much time for collecting.

At Blount Springs, Randolph creek was followed over most of its rock-bed between the mountains, from the railroad to the bottom lands of the Mulberry river. The river was followed up stream for several miles. Most of the distance the water was shallow, flowing over a seamed rock-bed.

The Black Warrior was followed from the wagon bridge near Warrior to the L. and N. R. R. bridge. The only shoal places were at the two bridges.

The Bucksehatchee creek near Calera was a water course with pools here and there.

A walk of three miles from Calera to Wilson's creek gave an opportunity to follow that shaded stream into Montevallo. Individ-

uals were not numerous until the town was reached, where in some places the bed of the stream was literally covered with *Goniobasis*. A large spring at the edge of the town furnished several species.

The Coosa river at Farmer, Shelby Co., offered no good collecting places, but farther up the stream at Ft. William's Shoals the stream was explored for considerable distance with very satisfactory results. In the clear, shallow water everything was plainly visible, the colors of the shells often showing with remarkable distinctness. Shoal creek, below Farmer, contained but few individuals.

At Wilsonville only one small shoal was searched.

At Wetumpka there are more accessible places for collecting than at any of the other Coosa river localities visited.

The Tallapoosa river above Tallassee, is a much broken stream caused by a rough rock-bed, with a considerable fall.

The *Pleuroceridæ* were looked for closely, and especially the Coosa river forms; but many described species and others listed from that stream were not found. Some of them were undoubtedly overlooked or are to be found in other situations than those explored, but I think the earlier collectors in some way mixed their collections; and species are credited to the Coosa river which were not found there, while some of the Coosa river forms were credited to other streams. This subject is open for further investigation.

For aid in determination of the species, thanks are due Prof. Pilsbry for kindly comparing a large part of the *Pleuroceridæ* and part of the *Unionidæ* with specimens in the Academy of Natural Sciences, and for describing some new forms of *Limnæidæ*. To Mr. Bryant Walker for his excellent work with new forms of *Somatogyrus*, etc. and identifying part of the *Helicidæ* and *Unionidæ*. And to Dr. Sterki for identifying the *Corbiculidæ*.

Very little attention was given the land shells and the fresh-water species which inhabit muddy situations. The *Unionidæ* were taken as they were noticed while looking for the *Pleuroceridæ*, so that this list is not as full as it might otherwise have been.

In the genus *Schizostoma* or *Gyrotoma*, the fissure appears to be the most constant character, while the striæ, carinæ, nodules, bands, ground-color and outline, all vary more or less.

FAMILY PLEUROCERIDÆ.

Pleurocera annuliferum Con. Warrior, common.

P. anthonyi Lea. Wetumpka.

P. canalitium Lea. Wilsonville.

P. dignum Lea. Spring Creek, Farmer.

P. excuratum Con. Decatur. Except for the striæ there is no difference between this and *moniliferum*.

P. formanii Lea. Wetumpka, common. Along the shore in muddy bays.

P. incrassatum Anth. Wilsonville and Wetumpka.

P. incrassatum Anth., var. *showalterii* Lea. Wetumpka.

P. moniliferum Lea. Decatur, often found in submerged logs.

P. nobile Lea. Decatur, found on muddy and sandy bottom.

P. ponderosum Anth. Decatur, common.

P. striatum Lea. Blount Springs.

P. thorntonii Lea. Spring Creek at Farmer.

P. vestitum Con. Montevallo and Blount Springs, common.

Lithasia brevis Lea. Wetumpka and Fort William Shoals.

Goniobasis ampla Anth. Wilsonville; Fort William Shoals and Wetumpka, common, often found devouring the animal from smaller shells.

G. capillaris Lea. Wilsonville; Fort William Shoals and Wetumpka.

G. carinifera Lam. Randolph Creek. Also Spring, Montevallo. This form was received from Prof. Call years ago, labelled *G. macella* Anth.

G. clausa Lea. Fort William Shoals and Wilsonville, common.

G. crebristriatus Lea. Wetumpka, specimens referred to this species are readily separated from *impressa* and *capillaris*, the young have not the carina of the former, and the mature specimens are not eroded like the latter, the outline and color differ from both.

G. crenatella Lea. Wetumpka; Fort William Shoals and Wilsonville.

G. cylindracea Con. Wetumpka and Fort William Shoals, common.

G. expansa Lea. Tallapoosa River, Tallassee; Mulberry River, Blount Springs, common.

G. fallax Lea. Wetumpka; Fort William Shoals and Wilsonville, common.

G. hydei Con. Black Warrior; Warrior, common.

G. impressa Lea. Wilsonville; Fort William Shoals and Wetumpka.

G. laeta Jay. Wilsonville; Fort William Shoals and Wetumpka, common. *G. lewisii* Lea and *culta* Lea are probably synonyms.

G. negata Lea. Wetumpka.

G. nigrocincta Anth. Spring at Montevallo.

G. nigrocincta Anth., var. *quadricincta* Lea. Tallassee.

G. nigrocincta Anth., var. *grata* Anth. Montevallo.

G. pybasii Lea. Calera.

G. rubicunda Lea. Wetumpka, common and variable.

G. semicostata Con. Randolph Creek and Blount Springs.

G. showalterii Lea. Fort William Shoals. The elongated operculum of this species, unlike that of *Anculosa rubiginosa*, shows a regular growth with the growth of the shell.

G. symmetrica Hald. Buckschatchee Creek, Calera; Randolph Creek, Blount Springs.

G. vanuxemiana Lea. Spring Creek; Fort William Shoals, Wetumpka and Wilsonville.

G. vanuxemii Lea. Fort William Shoals.

G. variata Lea. Montevallo, common.

G. wheatleyii Lea. Spring Creek, Farmer and Fort William Shoals.

Schizostoma alabamaensis Lea. Wilsonville and Wetumpka.

S. castaneum Lea. Coosa River, Wetumpka and vicinity. Mature specimens were rare. Fissure deep and narrow; three- or four-banded, when four-banded the two middle ones are approximate. The carina is obscure except at the tip of the young; the spire of mature specimens is eroded giving them a cylindrical shape.

S. constrictum Lea. The most plentiful species of this genus at Fort William Shoals, generally three-banded, smooth or inclined to be nodulous below the hem; differs from *incisum* by the fissure being more direct and deeper, ground color lighter, the bands are more distinct. *Incisum* is never nodulous. *S. amplum* and *salebrosum* are synonyms.

S. ellipticum Anth. (syn. *bulbosum* Anth.). Wetumpka and Wilsonville. Several hundred specimens show considerable variation, many are smooth, others more or less striate, some quite distinctly nodulous, three-banded, the bands generally broad, giving the shell a dark appearance. *S. cylindraceum* may be a form of this species.

S. glans Lea. Fort William Shoals, close to *ellipticum* if not a synonym.

S. excisum Lea (syn. *pumilum* Lea). Wetumpka and vicinity. Varies from cylindrical to globosely ovate, banded or without bands, those without bands are mature and nearly all of them show a disposition to have bands on the first whorl. The cord-like elevation behind the fissure is well developed on some while others show very little or nothing of it. The striae are generally distinct. The fissure is direct, medium in length and width.

S. glandula Lea. Described from one specimen. The only noticeable difference from *incisum*, of which it is a color variety, is the light color and the bands more narrow and distinct. The color and bands resemble *constrictum*, but the fissure places it with *incisum*.

S. incisum Lea. The most plentiful species of this genus at Wetumpka. The fissure is very short, wide and oblique, in some cases only a sinuous outer lip. The three broad bands are clouded, giving the shell a dark color.

S. lewisii Lea. Coosa River, near Wilsonville, Ala. Two specimens referred to this species may be only elongated forms of *G. impressa* with a very sinuous outer lip.

S. ovoideum Shutt. Wetumpka.

S. pyramidatum Shutt. (syn. *pagoda* Lea, *wetumpkaensis* Lea, *babylonicum* Lea).

Shell smooth, striate, or carinate, four-banded or without bands. The carina, always prominent on the young, disappears with the erosion of the spire. The fissure is short and constant in character. *Pagoda* was described from three specimens. In his description of *wetumpkaensis* Mr. Lea says it is umbilicate. I find this is not the case with all the specimens and especially the young, nor is the supposed umbilicus confined to *wetumpkaensis*. It is not a true umbilicus but caused by erosion. *S. babylonicum* was described from one specimen and I think it only a mature form of that described as *wetumpkaensis*. *Showalterii* and *demissum* may also be forms of this species.

Anculosa ampla Anth. There are not many specimens which I refer to this species. The epidermis and character of the bands, outline of body-whorl, and shape of aperture, differ from *picta* and all its varieties. The columella of the specimens from Fort William Shoals is always purple; it is white in a few specimens from Wetumpka and vicinity.

A small variety found on the exposed surface of stones in the swift current, is remarkably depressed with a very large aperture. The columella is broad and thickened its entire length; it is sometimes white instead of tinted and purple; the spire is very much depressed, hardly extending beyond the body-whorl; when placed aperture down, the apex is low down on the right side. One of the largest specimens measured over the columella, is .30 of an inch, the largest measurement is .40 of an inch. When placed aperture down, the height is .21; extreme length of aperture .30 of an inch, width from center of columella to outer lip .19 of an inch.

It seems to me that the forms described as *A. elegans* and *A. formosa* Lea, more properly belong in the synonym of *A. picta* instead of *ampla*. Young specimens referable to these varieties appear to be only color varieties of young *picta*.

A. melanoides Conrad. This unpretentious species was found on pebbles in strong current in Black Warrior River at a bridge near Warrior. The spire is more elevated than usual with the species of this genus, the perfect ones have four whorls, the spire of most specimens is eroded, only two whorls left. A few are banded, but most have no indication of bands. Mature specimens with eroded spire measure .40 to .45 length and .28 to .30 inch diameter. Columella a little thickened at the base and the aperture angulated at the juncture of the columella and outer lip.

A. picta Conrad. Common at Fort William Shoals, Wetumpka and vicinity. A very variable species, smooth, sometimes corded or plicate, or both. The bands extremely variable. The most common form is eight to twelve narrow bands made up of dots and dashes. These may be placed so as to form diagonal stripes as in *A. zebra* and *flammata*, and in some instances these diagonal bands are so strong as to blur the revolving lines of dashes. The bands are often continuous and number from two to twelve, or the two characters of bands may be alternate on the same specimen. Many are imperfectly banded and a few without bands, occasionally one in purple. The columella is often purple or tinged with that color; the prevailing color is white, the plicæ are often waves or folds. The shell may be globose. In old specimens the body-whorl is often compressed above the periphery, sometimes giving the shell a distorted appearance.

A. plicata Con. Black Warrior River at Warrior, Ala., common.

At this locality the species is not typical ; among several hundred there are few with small or indistinct plication. Most specimens are smooth with the exception of a raised line a little below the suture, which is more or less crenulate. Many specimens are three-banded, the upper one just below the raised line and narrower than the other two. None were found in the Coosa River.

A. ligata Anth. Wetumpka. The young of this species was often found on the under side of rocks in swift water.

A. rubiginosa Lea. Coosa River at Wetumpka also found at Wilsonville. More or less striate, in some striæ are remarkably well developed, producing costate specimens with a crenulated outer lip. In form they vary considerably. Some of the plicate specimens have a little resemblance to *A. plicata*, but evidently are not that species.

Specimens with an elongated operculum were found in only one situation, on the west side of an island above the Wetumpka bridge; the length of the operculum seemed to have no reference to the size of the shell. Occasionally one will have a clear, white columella. They are generally attached to rocks and pebbles in the current, and the colors show up bright and distinct through the clear water of the stream.

A. taeniata Con. The specimens I refer to of this species may be a smooth form of *rubiginosa*.

FAMILY VIVIPARIDÆ.

Viviparus contectoides Binney. n. var. Decatur. In a small swamp deeply shaded by a heavy growth of trees, this species was quite numerous. Mature specimens were rare, the larger part being very young to half grown.

Tulotoma magnifica Con. Coosa River at Fort William Shoals and Wilsonville. This species was nearly always found on the under side of rocks where there was little or no current. They were generally in colonies ; it was not uncommon to find 20 or 30 under a single stone a foot square or more.

T. magnifica Con., variety *bimomilifera* Lea. Farmer and Wilsonville. This form was found only in a fossil state. In some places they were numerous in cultivated fields and some distance above high-water mark. The size averaged larger than the living *magnifica* and the lower row of nodules is more strongly developed.

T. angulata Lea. Coosa River, Wetumpka ; this form differs

from *magnifica* by being smooth or nearly so, some being nearly as smooth as *viviparus*. They are found under rocks in the swift current of the stream. Both forms, *magnifica* and *angulata*, vary greatly in color from a light horn to a dark purple.

Campeloma ponderosum Say. Tennessee River, Decatur; Coosa River, Wilsonville; Fort William Shoals and Wetumpka.

C. coarctatum Lea. Black Warrior River, Warrior; Tallapoosa River, Tallassee.

C. decisum Say. Tennessee River, Decatur.

C. nolani Tryon. Coosa River, Wetumpka.

Lioplax cyclostomatiformis Lea. Black Warrior River, Warrior; Coosa River, Fort William Shoals and Wetumpka.

FAMILY VALVATIDÆ.

Valvata bicarinata Lea. Coosa River near the railroad bridge, Farmer, Ala., but three specimens found.

FAMILY AMNICOLIDÆ.

Somatogyrus aureus Tryon. Coosa River, Fort William Shoals, rare.

S. constrictus Walker. Coosa River, Wetumpka and Wilsonville, very few; nearly always found on the underside of the rocks associated with *S. coosaensis* and *S. hinkleyi*, very seldom more than one on the same rock. The light color, eroded spire and deep suture made them easily noticed among other species.

S. coosaensis Walker. Wetumpka, Fort William Shoals; common. On rocks in swift water; sometimes 25 to 30 were seen together.

S. crassus Walker. Wetumpka and Fort William Shoals; not plentiful.

S. hinkleyi Walker. At all localities in the Coosa River. One specimen supposed to be from the Tallapoosa River above Tallassee, was probably mixed with *S. pilsbryanus* by accident.

S. nanus Walker. Very plentiful at Fort William Shoals. They literally covered the rock-bed of the stream in favorable situations, showing up very plainly through the clear water, but owing to the swift current it was difficult and tedious collecting them.

S. obtusus Walker. Coosa River, Farmer, above the railroad bridge, found among the drift in a stagnant pool, made by the low stage of water.

S. pilsbryanus Walker. Tallapoosa River above Tallassee, very plentiful on rocks in swift water, often seen on the rocks back of the water as it fell over a natural dam.

S. pumilus Con. Tennessee River, Decatur, Ala. Found along the shore in muddy places, protected by saw-logs.

S. subglobosus Say. Tennessee River, Decatur, Ala. One specimen.

S. umbilicatus Walker. Wetumpka and Fort William Shoals, rare.

Amnicola n. sp. Coosa River near the railroad bridge, Farmer, Ala.

FAMILY LIMNÆIDÆ.

Limnæa desidiosa Say. In a small stream near the Union Depot, Montgomery, Ala. This species was quite numerous.

L. columella Say. Wilsonville, Fort William Shoals, Tallassee, Farmer and Blount Springs.

Physa pomilia Con. A small stream near the Union Depot, Montgomery, Tallapoosa River, Tallassee, Randolph Creek, and a small rill at Blount Springs.

(To be continued.)

THE LAND-SHELLS OF IRONBOUND ISLAND, MAINE.

BY DWIGHT BLANEY.

The following land-shells have been collected on Ironbound Island, Frenchman's Bay. This is one of the many rocky islands on the coast of Maine—with high cliffs toward the sea, and sloping to the water on the bay side.

Heavily covered with spruce mixed with a few birches, and with comparatively little cleared land, it does not seem a very likely place for collecting land-shells. Under the guidance of our friend Prof. Edward S. Morse, we have ransacked all favorable situations, and feel well rewarded with the following nineteen species.

The numerals refer to Pilsbry and Johnson's Land-shells of America.

No. 141. *Polygyra monodon* (Rack.), common.

No. 200. *Pupa muscorum* (L.), common.

No. 224. *Vertigo ventricosa* (Morse), common.

No. 224a. *Vertigo ventricosa* var. *elatio*r, (Sterki), rare.

This species is noted in the catalogue as from Ohio, Michigan and Minnesota.

226. *Vertigo bollesiana* (Morse), rare.

260. *Vitrea hammonis* (Ström), rare.

264. *V. binneyana* (Morse), common.

268. *V. ferrea* (Morse), common.

278. *Euconulus fulvus* (Müll.), common.

283. *Zonitoides arboreus* (Say), abundant.

293. *Z. exiguus* (Stimp.), common.

494. *Z. milium* (Morse), rare.

338. *Pyramidula alternata* (Say), abundant.

344. *P. striatella* (Anth.), abundant.

346. *Helicodiscus lineatus* (Say), common.

248. *Punctum pygmæum* (Drap.), common.

353. *Sphyradium edentulum* (Drap.), rare.

362a. *Succinea obliqua totteniana* (Lea), common.

367. *S. avara* (Say), not common.

The *Pupa muscorum* L. was found in a most interesting situation. On the seaward side of the island, on a rough, stony beach, rises a pinnacle of rock many tons in weight. This is nearly fifty feet high and is separated from the main cliff by about forty feet. I climbed one day to a flat place near the top, three feet square, covered with Juniper bushes, to gather some wild bluebells, *Campanula rotundifolia* L., and while clinging in this narrow space, picked over the valves of clams and mussel shells brought by Crows. Needless to say, I was inspired to find hidden in the lower shells, deep in the bushes, quite a colony of *Muscorum*. This is the only place on the island where this species is found, and a careful search on the adjacent cliffs revealed no more of them. How they could have got there is of course an interesting problem. Two fresh-water species are found on the island. *Pisidium abditum* (Hald.) and *Lymnæa caperata* Say, and the following land-shells have been found on neighboring islands.

13. *Helix hortensis* Müll, Little Duck Island, common.

106. *Polygyra sayii* (Binn.), Hancock Point.

180. *Strobulops labyrinthica* (Say), Soward's Island, common.

254. *Vitrina limpida* Gld., Calf Island, common.

NOTES ON SOME CAPE COD MOLLUSCA.

BY C. W. JOHNSON.

During a recent trip on Cape Cod, Mass., I was mostly interested in studying the insect fauna, but incidentally collected a number of shells. One afternoon, at low tide I wandered over the sand-flats of Provincetown harbor; on my way out I met a little Portuguese boy (Portuguese, by the way, constitute about one-third of the population) with a bucket full of periwinkles (*Litorina litorea*). I asked him what he was going to do with them. "Eat 'em," was his reply. To my inquiry whether they were good, he said, "Yep." The piling and rocks (the remains of an old pier) were literally covered with them; over almost everything was a coating of small barnacles (*Balanus balanoides*), and it was interesting to see the load carried by some of the periwinkles, often greater in size than the shell itself.

On every hand were trails of the sea-snails, but I was surprised to find that *Polinices* (*Neverita*) *duplicata* far outnumbered *P. (Lunatia) heros*; the former were much smaller than those I have collected on the New Jersey coast, and their nuchal bands, popularly known as "sand collars," were also correspondingly smaller. The nidus of *P. duplicata* is readily distinguished from those of *P. heros* by the lower or expanded margin being undulated or wavy. One specimen of *Columbella avara* was found. Of the Pelecypods, *Pandora gouldiana* was abundant, and two specimens of the old *Cytherea convexa* Say (which we must now call *Callocardia morrhuanus* Linsley), were collected. In places the coarse sand had a dark purple line. Close inspection showed it to be made up of the little *Gemma gemma*.

At Eastham are located a number of large fresh-water ponds, with no apparent inlet or outlet, in which the water is very clear, and quite cool. In the one nearest the station, called Depot Pond, I found three species of the *Unionidæ*. All of them were undersized, and very much eroded, features characteristic of still water, even though apparently more pure than many streams. The specimens of *Unio complanatus* were about two inches in length. It was by far the most common species, although dwarfed *Lampsilis radiatus*, about two and a quarter inches in length, with a thick, dark, sparsely rayed epidermis, was also abundant. The other species was a very fragile example of *Anodonta cataracta* Say (*A. fluviatilis* Dillw.), about two

inches in length. Attached to shells and stones were a few *Amnicola limosa*. Under an old board I found a colony of *Pyramidula striatella* associated with *Zonitoides arboreus*. In the salt marshes east of the station *Melampus lineatus* was in great numbers, together with a few *Litorina rudis* var. *tenebrosa*.

My first stroll along the beach at Chatham was at high tide. Coming upon some lobster pots I found quantities of animal life strewn about. Among them were beautiful specimens of *Polinices heros*, but the animals were dead, and were left behind because they took up entirely too much room for their size; they were like some specimens a friend once described as "dead, but not gone, and unwilling to be forgotten." The next day, at low water, in the little bights between the several bars which extend out from the beach south of the inlet, were to be seen hundreds of specimens of *P. heros* of all ages, from the size of a pea to one nearly four inches in length, while the nidi-mental bands were unusually large, and owing to the coarse sand exceedingly handsome.

Among the other interesting shells were the *Arca*s of the New England coast. *Arca transversa* and *A. pexata* Say, or as we must now call it *A. campechensis* Gmel. Is not this northern form worthy of a varietal name? As Say's description covers both, can we not restrict his name to this form as described and figured by Gould? Scattered along the outer beach we found upwards of twenty single valves of *Arca ponderosa* Say, several with portions of the ligament and epidermis in place. To find so many of this species at the extreme northern limit of its distribution was a surprise; it seems even to be more plentiful here than on the New Jersey coast. *Mesodesma arcuatum* was very common; a few valves of *Cochlodesma leanum*, *Astarte castanea* and two valves of *Divaricella quadrisulcata* were also found. In a heap of scallop shells *Pecten gibbus* var. *borealis* Say (*Pecten irradians* of authors), I obtained some very interesting examples of *Crepidula fornicata*, many of the specimens in adapting their shells to the surface of the scallop becoming strongly ribbed.

A rainy day had its advantages; it not only gave me a chance to attend to all the material I had collected, but it brought out the *Helix hortensis* in great numbers along the steep bank near the light-houses; they were all of the light-colored, bandless variety. I am not aware that this species has been recorded from this place which adds another locality to the mainland records.

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SOUTHWESTERN SHELLS.

BY JAS. H. FERRISS.

Joliet has a botanical park where nature herself made a good start in a collection. Fast as the money and friends can be had the collection is being improved. I am superintendent of the ferns upon a salary of 25 cents per year, which is to be paid whenever the commissioners have their salaries increased to that point. An effort to complete a collection of the U. S. ferns and cacti has led me into the Southwest after rare examples.

I was surprised on the first day out to find shells among the fern roots upon the hot side of the Franklin Mountain at El Paso, as surprised as when the ferns were found in the first place. This mountain of clay and rock, thoroughly baked, is as uninviting to the collector as a well-used brick kiln. There were two shells there, *Holospira roemeri* Pfr. and *Bulimulus dealbatus pasonis* Pils. This will be a species some day. Of less than twenty species found upon this first trip, six were new species or varieties.

Not until the last half of the fern trip made the present year were the snails given serious consideration. A collector will find few specimens in a land where to him the conditions are new, unless he gives his whole soul to the work.

Frank Woodruff, ornithologist and photographer of the Chicago Academy was with me a couple of weeks. At Deming, N. M., we formed an alliance with the city marshal who escorted us to the Florida Mts., ten miles away. At Bowie, Ariz., an expedition was

outfitted for the Chiricahua Mts. We went as far as old Fort Bowie. It was rather cold. Some mornings we crawled out from under snow-banks. Water was scarce, and our guides inexperienced. We were after birds, ferns, snap shots and Indian relics, and at the end of two weeks had found only four snails—*Sonorella hachitana* Dall, *Ashmunella walkeri* Ferriss, *A. levettei* Bld., and a *Physa*.

Former information told me the Chiricahuas were unexplored, and were occasionally exploited by the Apaches. By cautious approaches we made our way to the fort, now occupied by a single miner only. Here we learned there had been no raids for five years, and that the mountains were safe as the streets of Philadelphia.

At the fort Mr. Woodruff turned back to El Paso and Albuquerque. With a miner, ponies and a burro I pushed into the higher peaks. These run up about 8,000 feet. We pitched our tent in Cave Creek Canyon, and altogether it was a delightful situation,—caves, strange birds and plants, mountain streams, heavy forests, every day perfect, good folks, and new shells around every point. The miner herded the ponies, prepared warm suppers, and my regular daily grist was two shells I had never seen, and a new fern to the territory. The last day we packed up and visited a cave a quarter mile from our camp. Upon our return we found four snails we had never seen. Two were new species.

The next day we rode up a wagon road to a saw mill in a heavy pine forest at the top of the mountain. I walked a little and found one new species, two varieties and two I had not seen in the territory. This was a government forest reserve, and here we found Chas. T. McGlone, of Ashland, Ky., in charge, with a lion hunter for a partner, and the partner had a fiddle. The canyons are deep, heavily wooded and well watered; and truly at parting my heart was heavy. I know many species of snails were left behind.

The mountains seem rather difficult to reach from the railroads. They are far away, cattle ranches are about ten miles apart, and there are no stages or hotels, but the approach is easy enough, like snail hunting itself, when you catch on. From the Huachuca station on the Sonora branch of the Southern Pacific I walked fifteen miles across the plain to a canyon formerly visited, and in the next month wore out another pair of hob nails. I left home with rheumatism, dyspepsia and several more or less important defects, but was so busy no inventory had been taken since crawling out of the snow

in the Cuicahuas. The first Sunday morning in the Huachucas I rested up a little, and found there was nothing out of repair except a few fingers. I am not afraid of an automobile now.

Truly, snails were as thick together on the under surface of rocks as mussels are found on the seashore. At the very peak of one of the highest mountains, composed of slabs of limestone, there was not enough stone to cover the *Oreohelix*. They were hibernating on top and glued together in masses. Upon one side of the peak a dark banded variety was found, upon the other, not two hundred feet away, a white variety. This shell seems to be a home-body. A canyon though three miles in length from top to bottom, was usually peopled by one variety. Over a divide but a few steps was another variety, though every colony in the canyon was liable to have some distinctive mark in size, color or form. And this was true of the *Ashmunellas*. No two colonies seemed exactly alike, and they did not visit back and forth, nor travel far from the best part of their own rock pile.

On the south side of the Huachucas I found a colony of typical *Ashmunella chiricahuana* about one-half albinos, a mile west a colony of typical *Ashmunella levettei*, nearly all albinos. Half a mile lower down the *levettei* were chestnut-colored and polished. In between these three colonies were light horn-colored shells running from typical *levettei* with four large teeth to typical *chiricahuana* with no teeth at all, and all forms between, one tooth, two teeth, three teeth, rudimentary forms of these, and mere suspicions of teeth or thickening of the lip. Did these two species come together here, or was this the exact spot upon which the original *Ashmunella* Adam and Eve located? It is up to Dr. Pilsbry. I have described two species there can be no mistake in. With no courage left, the whole responsibility is now dumped upon his shoulders. The last heard from Messrs. Clapp and Walker, they were running too.

Some of the *Oreohelix* are black, white, brown, red, banded, lined, speckled, mottled and variegated, of only ten mm. diameter. Other colonies of similar colors were of twenty-five mm. diameter. Some were carinated, some as round-barreled and as umbilicated as a *Circinaria*, some depressed, and some were old-time bee-hives. The *levettei* colonies, outside of the albino camp, varied from dark chestnut to dull white, and from ten mm. diameter to twenty millimeters.

The broken rocks tumbled down from the cliffs, the "slide," or talus,

is the home of the snails. A good snail hoe is necessary, and one should wear gloves, for the chemicals, or climate, crack the collector's hands. A little shade helps, and the colonies will be found where the ventilation is good, the soil sweet and with a normal condition as to moisture, not wet or springy, but a natural soil condition. The most favorable location is selected, and the collector must not be discouraged at the absence of dead or living shells until after the thorough overhauling of a slide. *Ashmunella chiricahuana* was found, one by one, but after digging away at a rocky slide for an hour without results I found one pocket large as my hat with 85 examples, and soon after took 125 from a like pocket, and left the rest. *Oreohelix* and *Ashmunellas* were nearest the surface. Though hibernating, *Oreohelix* would be often found under the top stone. The *Ashmunellas* were next to the soil, and often buried in the loose leaf mould. *Sonorellas* were deep delvers, and lived down where the stones were wedged close together or buried in the soil. Seldom were more than one, two or three specimens found in one colony, not counting the little fellows, but such as they were I have never seen shells thicker in the southern mountains. I found a number of small shells in the drift on the plains which I did not find alive. *Holospiras* were usually found under dead vegetation upon dry hill-sides. *Vitrinas* were in damp ravines in the decaying vegetation. *Infundibularia tuba* Pils., was found in the drift of the San Pedro at Benson. It was not found in the Huachucas, or the drift of the streams from those mountains, and therefore I suspect it came from the mountains near Tombstone. There are a number of species credited to the Huachucas and Chiricahuas I did not find.

Fort Huachuca is a division headquarters of the army, and is occupied by three or four troops of cavalry. Many collectors visit the post and the mountains. Botanists and entomologists predominate. These mountains are probably no better than many others in the territory, but are good, and the collectors in the army lead the way. In the Carr Canyon I found C. R. Biedermann in a cabin of his own. He expects to remain there two or three years studying Arizona insect life for the Philadelphia Academy. From what he has told me of strange snails in strange places, and from what I have seen and run over without seeing, I am satisfied there is fully two years' hard work ahead for the collector who will do Arizona justice. I will do what I can, but all assistance will be cheerfully welcomed.

It is an open field, and the climate is glorious. Take a guide, for water is scarce. The verification of these wonders is now left to Dr. Pilsbry. He has the evidence.

Ashmunella walkeri Ferriss, n. sp.

The shell is much depressed, lens-shaped, acutely carinate peripherally, rather thin and pale corneous-brown. The umbilicus, narrow within, enlarges rapidly at the last whorl. Surface nearly smooth, very lightly marked with growth-lines. Whorls $4\frac{1}{2}$, slightly convex, the last very shortly descending in front. Base more convex than the upper surface. The aperture is small and very oblique, the lip well reflexed, white, with an obtuse, squarish tooth in the outer margin and two compressed teeth in the basal margin, the inner one smaller; these three being nearly equally spaced. There is a rather short, straight, obliquely set parietal tooth. Alt. $4\frac{1}{2}$, diam. $13\frac{1}{2}$ mm.

Florida Mountains, Luna Co., New Mexico. Found in a tumble of rock near the top of the mountain, probably an elevation of 6,500 feet. Only a few were found, and none found at any other place. Cotypes in collections of J. H. F. and A. N. S. P. This very distinct species differs from all other known forms of the *levettei* group in the small number of whorls. It is also flatter and more acutely keeled than any other *Ashmunella*.

Oreohelix clappi Ferriss, n. sp.

The shell is moderately depressed, the alt. about two-thirds the diam., and about equally convex above and below the obtuse peripheral angle. The umbilicus is about one-sixth the diam. and contracts rapidly within. It is brownish-white under a thin greenish-yellow cuticle with some darker oblique streaks and two indistinct brownish bands. In old individuals the cuticle remains only in small shreds. Sculpture of irregular growth-wrinkles and very fine, faint spiral striae, nearly obsolete on the upper surface. Whorls $4\frac{3}{4}$, convex, the last double the width of the preceding, the first $1\frac{1}{2}$ radially obliquely costulate. Base very convex. The aperture is short-oval, nearly circular, and very oblique. The ends of the lips converge, and in old shells are continuous, being connected by a short raised parietal ledge.

Alt. 9.6, diam. 15 to 16 mm.

Alt. 9, diam. 14 mm.

Cave Creek Cañon, Chiricahua Mts. Cotypes in collections of J. H. F. and A. N. S. P. Found alive, buried deeply in rotten shale about the base of cliffs near the stream.

This species differs from all the forms of *O. strigosa* by its radially costulate apical whorls and greenish cuticle.

LIST OF ALABAMA SHELLS COLLECTED IN OCTOBER AND
NOVEMBER, 1903.

A. A. HINKLEY.

FAMILY LIMNÆIDÆ (continued from August number).

Planorbis trivolis Say. A very few specimens found in same location as *Viviparus*, near Decatur, Ala.

P. bicarinatus Say. A single specimen taken from the Coosa River, near the railroad bridge, Farmer, Ala.

P. dilatatus Gould. Coosa River, Farmer, and Wetumpka. Very few found.

P. tantillus Pilsbry. Coosa River, Wetumpka. Found on rocks in swift water, generally on the under side; they are so small that collecting them was tedious, though they were abundant in places.

N. g., n. sp. Same location as above.

FAMILY ANCYLIDÆ.

Ancylus rhodacme Walker. A common species in the Coosa River at Fort William Shoals, Wetumpka and vicinity.

FAMILY HELICIDÆ.

Polygyra pustuloides Bland. Blount Springs, one specimen at Tallassee, Ala.

P. tridentata tennesseensis, W. and P. Warrior, Tallassee. Larger than the northern form of *tridentata*.

P. inflecta Say. Blount Springs, Tallassee, Warrior and Milstead.

P. obstricta carolinensis Lea. Wetumpka and Tallassee.

P. appressa perigrapta Pils. Tallassee, Warrior, Milstead, Farmer and Montevallo.

- P. thyroides* Say. Tallassee, Farmer and Warrior.
P. spinosa Lea. Blount Springs and Warrior.
P. stenotrema Bland. Blount Springs, Tallassee and Warrior.
P. hirsuta Say. Blount Springs and Warrior.
P. downieana Bland. Blount Springs. Only one specimen found.
P. monodon fraterna Say. Tallassee.

FAMILY CIRCINARIIDÆ.

- Circinaria concava* Say. Blount Springs and Tallassee.

FAMILY ZONITIDÆ.

- Omphalina polita* Pils. Blount Springs. Only two young ones found.

O. lævigata Pfr. Tallassee and Warrior.

Vitrea carolinensis Ckll. Blount Springs, Tallassee and Warrior.

Euconulus sp. Tallassee. Young specimens.

Zonitoides arboreus Say. Blount Springs, Tallassee and Warrior, common.

Gastrodonta demissa Binney. Blount Springs, Tallassee, Farmer and Montevallo.

G. interna Say. Blount Springs, Tallassee and Warrior.

FAMILY ENDODONTIDÆ.

Pyramidula alternata Say. Blount Springs, Tallassee and Warrior.

P. perspectiva. Blount Springs, Tallassee, Warrior and Milstead.

Helicodiscus lineatus Say. Tallassee.

FAMILY HELICINIDÆ.

Helicina orbiculata Say. Only dead specimens were found at Blount Springs. At Tallassee living specimens were found on a hill under leaves where the ground was damp.

FAMILY UNIONIDÆ.

Not being familiar with Charles T. Simpson's classification of the Unionidæ, I follow Dr. Lea, and use the genus *Unio* in its comprehensive sense.

Unio ocutissimus Lea. Mulberry and Black Rivers.

U. ulatus Say. Decatur.

U. anodontoides Lea. Wetumpka.

U. arctatus Con. Mulberry River and Black Warrior River, common.

U. arcus Con. Wilsonville, Wetumpka and Farmer.

U. asperatus Lea. Fort William Shoals and Wilsonville, common.

U. atrocostatus Lea. Black Warrior River, common. Fort William Shoals.

U. blandianus Lea. Fort William Shoals, one specimen.

U. brumbyanus Lea. Mulberry River, common.

U. cahawbaensis Lea. Mulberry River, common.

U. cerinus Con. Black Warrior River.

U. chattanoogaensis Lea. Coosa River, Wetumpka.

U. chunii Lea. Coosa River, Wetumpka, one specimen.

U. compactus Lea. Coosa River, Wilsonville and Farmer.

U. cornutus Bar. Fort William Shoals, Decatur and Wilsonville.

U. corrunculus Lea. Black Warrior River.

U. crassidens Lam. Decatur and Coosa River.

U. ebenus Lea. Decatur.

U. decisus Lea. Fort William Shoals and Wetumpka.

U. dolosus Lea. Wetumpka, common.

U. dromas Lea. Decatur.

U. excavatus Lea. Black Warrior River, common; Wilsonville, one specimen; Mulberry River and Wetumpka.

U. fibuloides Lea. Coosa River, Wetumpka, one specimen.

U. flavescens Lea. Black Warrior River, common; Mulberry River.

U. foremanianus Lea. Fort William Shoals, common.

U. gibbosus Barnes. Decatur.

U. gracilis Barnes. Coosa River, Black Warrior River at Warrior, Mulberry River at Blount Springs.

U. greenii Con. Mulberry River.

U. instructus Lea. Black Warrior River, common.

U. lewisii Lea. Coosa River, Fort William Shoals and Wetumpka.

U. lienosus Con. Black Warrior River, common.

U. metanever Raf. Fort William Shoals, one specimen.

U. metastriatus Lea. Black Warrior River.

U. multiradiatus Lea. Coosa River, Wetumpka, one specimen Wilsonville, one specimen.

- U. obliquus* Lam. Decatur.
U. orbiculatus Hild. Decatur.
U. parrulus Lea. Mulberry River and Black Warrior River.
U. penitus Con. Coosa River, Wetumpka and Black Warrior River.
U. perovalis Con. Mulberry River.
U. perplexus Lea. Decatur.
U. planus Lea. Coosa River and Fort William Shoals, two specimens.
U. plenus ~~Lea~~ Decatur.
U. pyramidatus Lea. Decatur.
U. rectus Lam. Black Warrior River.
U. retusus Lam. Decatur, Ala.
U. rubidus Lea. Black Warrior and Mulberry Rivers.
U. rubellus Lea. Black Warrior River, Warrior, common.
U. rumphianus Lea. Black Warrior and Mulberry Rivers.
U. securis Lea. Fort William Shoals, Wetumpka and Decatur.
U. sparus Lea. Mulberry River.
U. sublotus Lea. Mulberry and Black Warrior Rivers.
U. stabilis Lea. Black Warrior River.
U. tuberculatus Barnes. Found at all river localities.
U. vibex Conrad. Mulberry River, Blount Springs, Ala.
U. vanuxemensis Lea. Wetumpka, Black Warrior and Tallapoosa.
Anodonta subrexa Con. Black Warrior River.
A. sp. Black Warrior River and Warrior, Ala.
A. sp. Coosa River.

FAMILY CORBICULIDÆ.

- Sphærium solidulum* Prime. Bucksehatchee Creek, Calera, Ala., common.
S. striatinum Lam. Black Warrior River, and Warrior. Rather scarce, muddy places.
Musculium contractum Prime. A single specimen taken from the Bucksehatchee Creek, Calera, Ala.
Pisidium virginicum Gmel. Tennessee River, Decatur, Mulberry River, Blount Springs, Black Warrior River, Warrior, Ala.

THE CAMBRIDGE NATURAL HISTORY: ERRATA CORRECTED.

ROBERT E. C. STEARNS.

On page 38, Vol. III., "Molluscs, etc.," of the Cambridge Natural History (1895), occurs the following:

"Mr. R. E. C. Stearns records³ a case of *Buliminus pallidior* and *H. veatchii* from Cerros I., living without food from 1859 to March, 1865."

The figure "3" refers to the Am. Nat., XI. (1877), p. 100; Proc. Calif. Ac., iii, p. 329, in the foot-note, as the sources of the foregoing statement which contains about as many errors as it is possible to get in less than three lines. I am well acquainted with the person referred to, and have been for many years, also with his articles in the volumes named in the foot-note, and can safely assert the word *Buliminus* does not occur in either of his papers. He does not say that the bulimoid form lived from 1859 to March, 1865, but that examples of *Bulimus pallidior* lived from March, 1873, the day they were collected, until June 22, 1875, *two years, two months and sixteen days*, and that the specimens were collected at San José del Cabo, Lower California; further, that one individual of the nine was still living October 18, 1875. This species has not as yet been reported from Cerros Island, where *H. veatchii* was collected and lived, as stated.

On page 278 of the Cambridge volume it says that the genus *Buliminus* is peculiar to the Old World. I am not aware of its having any representative in the Americas. We now write *Bulimulus* for *Bulimus*, as I had it written in 1873.

Los Angeles, Cal., July 19, 1904.

PLECTOPYLIS IN THE RIUKIU ISLANDS.

BY H. A. PILSBRY.

Plectopylis (Sinicola) hirasei, n. sp.

Shell small, depressed, openly umbilicate, the upper surface convex; uniform olivaceous brown. Surface dull above, glossy beneath, sculptured above with fine growth-striæ cut into minute beads by equally fine decussating lines; below with arcuate, rather irregular and wide-spaced delicate riblets and fine growth-striæ, and rather

weak spiral lines. Whorls 6. very slowly increasing, convex, the last slightly deflexed in front, the periphery near the summit, the base very convex. Aperture small, lunate, the peristome narrowly reflexed and a little thickened, connected across the parietal margin by an elevated white, callous lamella. At its last third the last whorl is obstructed within by a vertical parietal barrier, behind the ends of which stand two tubercles, the upper one triangular, the lower one oblong, each giving out a low callous towards the other; and by six palatal plicæ: the first minute, subsutural; the second larger, slightly oblique and curved; the next three connected, larger and more oblique, and the sixth plica smaller and standing on the umbilical wall. Alt. 3, diam. 5.7 mm.; width of umbilicus 2 mm. Miyakojima, Riukiu. Types no. 87637 A. N. S. P., from no. 1295 of Mr. Hirase's collection.

This is the first *Plectopylis* found in the Japanese Empire, and is one of the most interesting of Mr. Hirase's many discoveries. The admirable studies of Mr. Gude enable us to fix its position as nearest the Chinese *P. cutisculpta* Mlldff. (see Gude, *Science Gossip*, iii, 180, 181, Dec. 1896, and Mlldff., *Jahrb. D. M. Ges.*, ix, 1882, p. 184, and x, 1883, pl. 12, f. 12).

A NEW LOWER CALIFORNIAN SONORELLA.

BY H. A. PILSBRY.

Sonorella lohrii lioderma, n. subsp.

The shell is similar to *lohrii*, but the last whorl is a little more convex and evenly rounded, and the last two whorls are glossy, with no granulation, being marked with faint growth-striæ only. The spire is sometimes a little more elevated than the type of *S. lohrii*.

Near Moleje, Lower California, Cotypes no. 58107 and no. 88367 A. N. S. P., the latter from Lower California without special locality.

The type specimen of *S. lohrii* Gabb is finely granulated throughout. *S. l. lioderma* would be a species the way some people cut up *Sonorella*.

GENERAL NOTES.

WEST AMERICAN SHELLS.—Professor Keep's new book on the shells of the Pacific coast is now in press, and will be published in a short time. There will be over 300 illustrations. The marine

shells include those of British Columbia and Alaska, and land and fresh-water shells from west of the Rocky Mountains.

CLAMS AFFECTED BY SEWERAGE.—The local quahog, or little-neck clam, and scallop industry is menaced by action of the State Board of Health declaring the shellfish taken in New Bedford harbor and Clark's cove to be infected, and calling upon the commissioners on inland fisheries and game to prevent further taking. The number of men engaged in quahog-fishing here is about 300, and the income involved ranges between \$50,000 and \$75,000.

The sewers of New Bedford and Fairhaven all enter into the river and cove. The eagerness of the fishermen, many of them French-Canadians, has carried them nearer and nearer to the sewers, until they are frequently seen at work at the sewers' mouths.

The board has been making bacterial tests since last spring, and reports that the shellfish are polluted by the sewer.

The demand of the State Board will also affect the fall and winter scallop fishing, another important industry.—*Boston Evening Record*.

ZOOLOGICAL RECORD FOR 1903.—The Zoölogical Society of London is now issuing "special records." Each volume is divided into twenty parts. The part (VII.) on *Mollusca* by Mr. E. R. Sykes, assisted by Mr. E. A. Smith, has been received. It contains 85 pages, the matter being arranged admirably for ready reference. It is furnished by the Society for 4 shillings.

A NEW LOCALITY IN SOUTH CAROLINA FOR RECENT AND FOSSIL MOLLUSKS.—I write to call the attention of collectors to a new locality in a new though old country. This is a long beach on the ocean front, without breaks for thirty miles, as I am informed. An ideal place for automobile explorations. I was only there for a half day, and saw only a part of the shells, but they are there by the millions.

There are many *Cretaceous*, *Eocene*, *Pliocene* and *Pleistocene* shells—as well as immense numbers of recent specimens. The locality is "Myrtle Beach." There is a ten-mile railroad from Conway over there and a good hotel. Conway is the county town of Horry (pronounced "Oree") county, South Carolina, and has heretofore been out of the world, but now has railroad connections with the Coast Line Railroad, and is an ideal place for conchologists and botanists.—FRANK BURNS, Ph. D.



ALDRICH: OSTREA ARROSIS.

THE NAUTILUS.

VOL. XVIII.

OCTOBER, 1904.

No. 6.

A NEW OYSTER FROM THE EOCENE OF ALABAMA.

BY T. H. ALDRICH.

OSTREA ARROSIS n. sp. Pl. III, figs. 1-4.

Shell oval, lower valve thick and heavy, upper valve thin. Surface of lower valve strongly ribbed, ribs very numerous, close-set and cross marked by growth lines, inner edge of lower valve is scalloped. Both valves have a large, muscular scar, not central. The beak is strong, making a stout hinge in the lower valve, much smaller in the upper. The upper valve is smaller, fitting into the other ventrally above the crenulations; its surface is generally covered with fine, raised lines of growth; interior with crenulations near the beak, becoming obsolete on the ventral margin. Size of old specimens 125 to 140 mm. from beak to ventral margin, about one-fifth less at right angles across the shell.

Locality.—Fleming's Mill, on Pea River, in Southeast Alabama, from the Nanafalia horizon.

Remarks.—Figures 1 and 2 are the exterior and interior of a large, lower valve; fig. 4, upper valve of young shell; fig. 3, young shell with both valves in place. In old shells the ribbing becomes obsolete on the beak, and in some examples the beak is bent strongly to one side. This oyster seems to be the precursor of *O. sellaeformis* Con. Some young examples occur in the Alabama River lignitic, but the full-grown shell has not before been found that I am aware of.

NEW AMERICAN LYMNÆAS. II.

BY FRANK COLLINS BAKER.

Lymnæa decollata oronoensis var. nov.

Shell very globose, inflated, solid; whorls $3-3\frac{1}{2}$, very convex, the last almost globular; spire broadly conic, depressed, sutures a little impressed; aperture roundly ovate, the upper part shouldered two-thirds the length the entire shell; columella with a distinct plait; umbilicus very narrowly open; color a rich greenish horn, inclining to black in some specimens. The spire is frequently decollated.

Length 17.00; width 11.50; aperture length 11.00; width 7.00 mill.

Length 16.00; width 10.00; aperture length 10.00; width 6.00 mill.

Length 17.00; width 12.00; aperture length 12.00; width 8.00 mill.

Length 12.00; width 9.00; aperture length 8.75; width 5.50 mill. (half grown).

Distribution: Orono, Maine. (Collection of Mr. Bryant Walker.)

This variety may be distinguished from *decollata* by its larger size, more globose form of whorls and the whole shell, and the rounded aperture shouldered at the upper part. The young or half-grown shell somewhat resembles young individuals of *mighelsi* and *catascopium*.

Haldeman's figure 3 on plate 14 of his monograph seems to represent a form of this variety. It appears to be quite a characteristic variety.

Judging from specimens received by Mr. Bryant Walker from Mighels and examined by the writer, *decollata* has been figured accurately only by Haldeman in his monograph, plate 14, figs. 1, 2. The species has not been understood by most American collectors, specimens of *emarginata*, *catascopium* and *mighelsi* having been received as *decollata*. It is, however, a very characteristic species, not closely connected with any other form. The variety *oronoensis* resembles some young forms of *mighelsi* as well as some varieties of *catascopium*. This resemblance, however, is merely superficial.

The typical *decollata* received from Mighels measure as follows:

Length 12.00; width 8.00; aperture length 9.00; width 5.50 mill.

Length 12.25 ; width 8.00 ; aperture length 9.00 ; width 5.50 mill.

Length 11.25 ; width 7.75 ; aperture length 8.00 ; width 5.00 mill.

Length 9.75 ; width 7.00 ; aperture length 7.00 ; width 4.50 mill.

Lymnæa randolphi nov. sp.

Shell large, generally inflated, ovate ; whorls five to six, rounded, inflated, distinctly shouldered ; spire short, pyramidal ; the first 3-4 whorls are small and regularly wound, but the last whorl abruptly enlarges to more than four times the diameter of the preceding whorls, causing the spire whorls to appear as though set upon a pedestal ; sutures deeply impressed ; sculpture consisting of close-set, regular lines of growth crossed by fine, impressed, spiral lines ; the surface is malleated in many specimens and in some individuals there is a tendency to form raised spiral ridges on the body-whorl ; aperture very large, ovate, almost patulous, distinctly shouldered at the upper part ; columella without distinct plait, but covered by a heavy, erect callus which overhangs the umbilicus ; umbilicus deep, widely open ; color probably horny as in the majority of *Lymnæidæ*, but chalky white in the type specimens. Length 29.5, diam. 20, length of aperture 19. mm.

Habitat : Marsh Lake, near Dyea Valley, Alaska, collected by Mr. P. B. Randolph.

This is a very distinct species, not easily confounded with any other. It has a superficial resemblance to *Lymnæa mighelsi* Binney, but that species is imperforate or at most only very narrowly perforated. The shape of the spire, the rounded aperture and the open umbilicus will easily distinguish it.

Lymnæa atkensis Dall, is a narrow species with a long spire, a very narrowly open umbilicus and wholly lacks its peculiar shouldered whorls. The sculpture is more marked in *randolphi*.

Cotypes are in the Academy of Natural Sciences of Philadelphia and in the Chicago Academy of Sciences.

A GLIMPSE AT THE SHELL FAUNA OF DELAWARE.

BY S. N. RHOADS.

Literature is strangely silent as to the fauna of the State of Delaware. To remedy this in some degree, as well as to satisfy a long-

standing curiosity to compare the zoölogical features of the Bay State with those of New Jersey, my old tramping ground, I paid her five or six visits in different localities during the spring, summer and fall of 1903. While these expeditions were mainly ornithological, the Mollusca claimed more than passing attention, and a small collection of specimens was made and presented to the Academy of Natural Sciences of Philadelphia, where Prof. H. A. Pilsbry kindly made the identifications and comparisons here recorded.

Disclaiming any but a tyro's knowledge of conchology, it only remains for me to preface these records by stating my conviction that the evidence given by the *vertebrates* of Delaware indicate that her southernmost border is more strictly Lower Austral than Upper Austral. Certain species of birds and reptiles are found there which do not occur in southern New Jersey or Pennsylvania. In the Brandywine valley hills above Wilmington there is perhaps a shade of approach to a preponderating number of species typical of the Upper Austral and Lower Transition. In the upper Choptank valley the Lower Austral finds its most northerly reaching arm on the Atlantic seaboard, and the bird fauna there found in the thickly-forested bottoms is a curious combination of three distinct sub-faunæ, one northern, one western, and another southern. (R.)

In general character, the snail fauna is nearly identical with that of eastern Maryland west of the Chesapeake, but there are a few somewhat conspicuous differences, such as the occurrence of typical *Polygyra tridentata*, in place of *P. t. juxtidentis*, in Maryland. *Pyramidula alternata fergusonii* (Bld.) is another species of the coastal plain, which has not yet been found in Maryland or eastern Pennsylvania.

The *Unionidæ* offer unexpected interest by the finding of a colony of dwarf races of several species at Seaford, Sussex Co. (P.) Seaford is at the head of navigation on the Nanticoke River, an affluent of Chesapeake Bay, and lies near the centre of the level region reaching, with but slight elevation above high-tide level, across the entire peninsula. It is a sandy loam country with stretches of piney uplands and extensive areas of half-swamp lands. The left bank of the river is fifteen to twenty feet high in some places. Some scattered cypresses and white cedar occur on the left bank, but have nearly been exterminated. The botany and vertebrate zoölogy of the region are Lower Austral rather than Upper Austral in their prevailing

species, this being the dividing line between the two faunal regions. (R.)

In this locality the Uniones are normal in shape, but very much smaller than in other places in Delaware and the neighboring states.

Adult specimens of *Unio complanatus* measure 42 to 52 mm. long (the normal size being 70 to 95 mm. in other Delaware streams).

U. fisherianus is 40 to 43 mm. long, against 95 to 108 mm. at Choptank Mills.

Lampsilis cariosus, 40 to 44 mm. long.

Lampsilis ochraceus, 40 to 50 mm. long.

Lampsilis radiatus, 42 to 48 mm. long.

Lampsilis nasutus, 50 mm. long.

The whole *Unio* fauna is thus dwarfed, the shells being from about half to two-thirds the ordinary size. (P.)

It has occurred to me that the dwarfing of the Unionidæ of the Nanticoke may be due to the fact that no tributary of this sluggish river runs through a soil furnishing ingredients favorable to shell growth. The relative sluggishness of this whole river system may also have the degenerating effect of non-resistance. (R.)

In the following list a few Delaware shells collected by Mr. Witmer Stone are included, such records being duly credited :

Polygyra tridentata (Say). Brandywine Valley between Duponts and Rockland, Delaware.

Polygyra albolabris (Say). Brandywine Valley between Duponts and Rockland, and hills southwest side Brandywine near Paline, Delaware. (W. Stone!)

Polygyra thyroides (Say). Brandywine Valley between Duponts and Rockland; southwest of Brandywine Hills just below Penn. State line; and near Delaware City, Delaware. (W. Stone!)

Polygyra hirsuta (Say). Brandywine Valley between Duponts and Rockland, and near Delaware City, Delaware.

Polygyra monodon fraterna (Say). Brandywine Valley between Duponts and Rockland, Delaware.

Strobilops labyrinthicus (Say). Brandywine Valley between Duponts and Rockland; near Dover, Kent Co.; also near Delaware City.

Bifidaria contracta (Say). Near Delaware City, Delaware.

Circinaria concava (Say). Brandywine Valley between Duponts and Rockland, Delaware.

Vitrea hammonis (Strom). Choptank River, just below Choptank Mills (one mile east of Henderson, Maryland), Kent Co.

Vitrea indentata (Say). Choptank River, just below Choptank Mills (one mile east of Henderson, Maryland), Kent Co. Also Brandywine valley between Duponts and Rockland, and near Delaware City.

Zonitoides arboreus (Say). Choptank River, just below Choptank Mills, Kent Co.; Brandywine valley between Duponts and Rockland; Mt. Cuba and southwest side of Brandywine hills, just below Pennsylvania State line (W. Stone!), near Delaware City; near Dover, Kent Co., and Seaford, Sussex Co.

Gastrodonta ligera (Say). Brandywine valley between Duponts and Rockland.

Gastrodonta suppressa (Say). Brandywine valley between Duponts and Rockland. Southwest side Brandywine hills, just below Paline and Mt. Cuba (W. Stone!); also near Delaware City.

Philomycus carolinensis (Bosc.). Mt. Cuba (W. Stone!), Brandywine valley between Duponts and Rockland.

Pyramidula alternata fergusonii (Bld.). Brandywine valley between Duponts and Rockland.

*Lymnæa*¹ *humilis* (Say). Near Delaware City; between Dupont's Powder Mill and Rockland.

Lymnæa desidiosa (Say). Brandywine river between Duponts and Rockland.

Lymnæa columella (Say). Brandywine river between Duponts and Rockland; Seaford, Sussex Co.

Planorbis bicarinatus (Say). Brandywine river between Duponts and Rockland.

Physa heterostropha (Say). Brandywine river between Duponts and Rockland; Seaford, Sussex Co.; head of Red Clay creek, Christiana township.

Goniobasis virginica (Gmel.). Brandywine River between Dupont's Powder Mill and Rockland; also Seaford, Sussex Co., Delaware.

Sphaerium sp. Head of Red Clay Creek, Christiana Township, Delaware.

¹ The original orthography of this name is here restored. American authors have almost universally spelled it *Linnæa*.—H. A. P.

Lampsilis nasutus (Say). Seaford, Sussex Co.; Choptank Mills, Kent Co., Delaware.

Lampsilis radiatus (Gmel.). Seaford, Sussex Co., Delaware.

Lampsilis cariosus (Say). Seaford, Sussex Co., Delaware.

Lampsilis ochraceus (Say). Seaford, Sussex Co., Delaware.

Unio complanatus ('Sol.' Dillw.). Seaford, Sussex Co.; Head of Red Clay Creek, Christiania Township; Choptank Mills, Kent Co.

Unio fisherianus Lea. Seaford, Sussex Co.; Choptank Mills, Kent Co., Delaware.

Anodonta cataracta Say. Mill-pond at head of Indian River, Millsboro, Sussex Co.; Choptank Mills, Kent Co., Delaware.

Strophitus edentulus (Say). Head of Red Clay Creek, Christiana Township, Delaware.

Strophitus undulatus (Say). Choptank Mills, Kent Co., Delaware. A single, well-developed specimen.

Alasmodonta marginata varicosa (Lam.). Head of Red Clay Creek, Christiana Township, Delaware.

NOTES AND NEWS.

A PECULIAR HALIOTIS.—Not long ago a freak in the *Haliotis* line came under my observation, and thinking it of sufficient interest to the readers of THE NAUTILUS, I send the following description: The shell is, in most particulars, a characteristic *Haliotis cracherodii*, measuring $4\frac{1}{2}$ inches in length, $1\frac{1}{2}$ inches in height, and $3\frac{1}{8}$ inches in width. It was obtained from a lot of shells brought from the coast of Lower California, by Frank Holzner, a local dealer in shells and curios, and unlike any other I have seen, has no holes whatever, and no scars or indentations to indicate even a good intention in that direction.—F. W. KELSEY.

NEW CAVE-SNAILS.—Dr. R. Sturany has been investigating an interesting collection of snails from caverns in Herzegovina (*Nbl. D. M. Ges.* for July-Sept., '04). Besides species of *Clausilia* and *Pupa*, he describes a very small subcylindric land-snail with a round mouth and hairy cuticle as *Pholeoteras euthrix*. It is 2.5 to 3 mm. long, and has minutely latticed sculpture, beginning even upon the embryonic whorl. As only empty shells were found, and nothing

resembling them is known, the position of the new genus is left uncertain. It is curious that with the exception of a *Carychium* discovered by Dr. R. E. Call in Mammoth Cave, no cave-snails have been found in America. Those having opportunities should search in other caves of this country.

PUBLICATIONS RECEIVED.

MOLLUSCA OF THE "PORCUPINE" EXPEDITIONS.—By E. R. Sykes (Proc. Malac. Soc., London, VI, 1904). The material collected by these dredging expeditions in the northeast Atlantic, etc., was not wholly examined by Jeffreys, whose death interrupted the work. Mr. Sykes is now supplementing his valuable reports, the first paper dealing with the Tectibranchs. A number of new forms are described, with valuable information upon others. An excellent plate illustrates several little-known species.

A CRITICAL LIST OF THE SPHEROSPIRA SECTION OF THESITES.—By Hugh Fulton. (Journal of Malacology, XI, 1904.) With the specimens from the Cox and Beddome collections, Mr. Fulton has critically revised this group of handsome Queensland Helices, correcting numerous errors in former works, and naming as new *T. consors*, a form figured as *T. parsoni* Cox in the Manual of Conchology. It is only fair to say that most of the errors in former works were due to wrongly named shells sent out by Cox and other Australian conchologists. The work seems to be well done and will be of value to collectors having these fine Australian snails.—H. A. P.

AN HISTORICAL AND SYSTEMATIC REVIEW OF THE FROGSHELLS AND TRITONS.—By W. H. Dall. (Smithsonian Misc. Coll., Vol. 47, 1904.) Perhaps no prominent gastropod family has suffered such vicissitudes of nomenclature as the Tritons. Dr. Dall, without going into their morphology to any length, has fundamentally examined the nomenclature and taxonomy of the group from the earliest times, and gives in this paper the results of an investigation of the early literature of the groups, which may well be called exhaustive. In the *Ranellidæ* he recognizes one genus, *Bursa* Bolten,

equivalent to the old genus *Ranella*. The Tritons are arranged thus :

Family SEPTIDÆ.

Genus *Trachytriton* Meek (Cretaceous only).

Genus *Personella* Conr. (Eocene, and perhaps including the recent *Triton quoyi* Rve).

Genus *Ranellina* Conr. (Eocene).

Genus *Gyrineum* Link (Tritons with continuous lateral varices).

Genus *Eugyrina* Dall (Type *Ranella gigantea* Lam.).

Genus *Argobuccinum* Mörb (Type *Ranella vexillum* Brod. Includes also the West Coast species *Priene oregonensis* Redf., etc.).

Genus *Distortrix* Link (*Distorsio* of authors).

Genus *Cymatium* Bolten (*Triton femorale*, etc.).

Genus *Septa* Perry (Large forms such as *T. tritonis*, etc.).

In recent years all of these groups containing recent species have been generally recognized under one name or another. *Cymatium* contains nearly all the forms ordinarily called "Triton" except those segregated in *Septa*, a group which Dall considers sufficiently differentiated for generic rank, although Kesteven and others have opposed this view.

The classification proposed by Dall will, we believe, meet with general approval. It seems worthy of acceptance pending the investigation of the soft anatomy of the snails in question, which is still imperfectly known.

The chief innovations in generic nomenclature of the two families are for the most part consequent upon the adoption of the *Museum Boltenianum* as an acceptable source of nomenclature,—a position still in debate. This work is so excessively rare that it is hardly to be called published in the ordinary sense. Of the first edition—which is the only one seriously affecting nomenclature—there is one copy in America and we suppose not over half a dozen, if so many, known in the world. Even in Germany, Herrmannsen, over fifty years ago, could not get access to a copy, though he made conchological literature an exclusive study for years. The work has other objectionable features, as the free use of polynomials, such as *Cymbium cochlear neptuni*, *Cardium cor auritum*, *Murex mitra episcopalis*, *Cassis mitella polonica*, *Neptunea corona mexicana*, etc. Nobody who swallows these ought to choke over Chemnitz. It is evident that some general consensus of opinion is called for, before it will be ad-

visible to throw aside the clear-cut images of Lamarck and his school for their nebulous prototypes in Bolten, which have been all but unknown for over a century.

The genus *Colubraria* is made the type of a new family *Colubrariidæ*, which, however, is not defined. *Colubraria* is as yet unknown anatomically. We have elsewhere shown that, as limited by Dall, the family is a mixture of *Buccinidæ* and *Muricidæ*, with possibly another, but still unknown, element in the typical *Colubrarias*.

The essay, though not lengthy, will be read with great interest by those who make a study of molluscan nomenclature. The eminence of its author, both in the field of malacology and of general zoölogical nomenclature, will ensure a thorough consideration of the positions taken, by those competent to deal with such questions—H. A. P.

NOTES ON THE PLEUROTOMIDÆ, with description of some new genera and species. By Thos. L. Casey. (Trans. Acad. Sci. of St. Louis, XIV.) Mr. Casey proposes a new classification of the family, establishing eight "tribes" based chiefly upon characters of the sinus. The consideration of genera is confined mainly to those represented in the American tertiaries, some 20 new genera being erected. Numerous new Eocene species are described, chiefly from Alabama and Texas. A single new recent species, *Helenella insolens* from St. Helena, is described. Mr. Casey subdivides much more minutely than has been the custom in this family, raising nearly every group to generic rank. While "genera" and "subgenera," etc., are essentially conventional, varying in rank with every investigator, yet minute subdivision may easily be carried too far for practical convenience by reason of the great number of species likely to be found to fall between such narrowly restricted groups, requiring the formation of still more new "genera." The characters of the protoconch are extensively used. This is perhaps the most valuable feature in the paper, as they have not hitherto been adequately studied in the *Pleurotomidæ* generally. The genus *Donovania*, included by Mr. Casey in the *Pleurotomidæ*, has been shown to belong to the Rhachiglossa.—H. A. P.

THE MUSEUM. By L. P. Gratacap (Journal of Applied Microscopy, V.). All sides of the subject, from the location and archi-

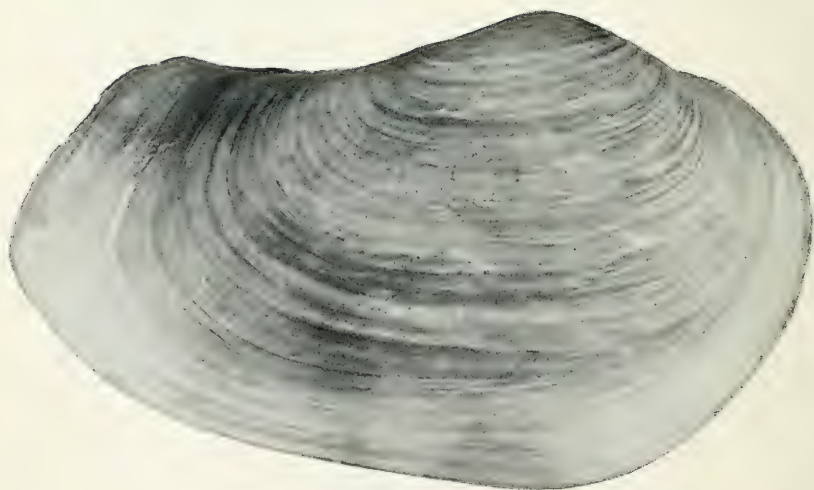
ture of museum buildings to the cases for storage and display, and the installation and labeling of collections, are considered by Mr. Gratacap, whose practical experience in one of our largest museums gives his ideas a high value. The brochure is copiously illustrated.

THE EFFECT OF THE BASSIAN ISTHMUS upon the existing marine fauna; a study in ancient geography. By C. Hedley (Proc. Linn. Soc. N. S. Wales, 1903). A 35-fathom line on either side would bound a submarine plateau 80 to 90 miles wide, stretching from Australia to Tasmania. Mr. Hedley considers at length the great faunal difference between the South Australian and East Australian coasts, concluding that the faunal evidence indicates that Bass' Strait was bridged until recent times by an isthmus. The deeply dissected south coast of Tasmania indicates recent subsidence there also, pointing to a former extension of Tasmania southwards, thus separating what he terms the *Adelaidean* from the *Peronian* or temperate East Australian faunas, by a promontory extending into decidedly colder waters. The ideas advanced are well supported and supply a beautifully simple explanation of the long-known and hitherto unexplained diversity of the South Australian and Victorian marine faunas.—H. A. P.

ADDITIONS TO THE MARINE MOLLUSCAN FAUNA OF NEW ZEALAND. By Charles Hedley (Rec. Australian Museum, V, pt. 2, 1904). In reporting upon a parcel of dredgings, Mr. Hedley remarks that "the fauna of the continental shelf of New Zealand is practically unknown. It also appears that the element common to New Zealand and Australia, hitherto calculated on the beach fauna, will be disproportionately increased when the fauna of the continental shelf is taken into consideration." Besides new forms of several genera, Hedley describes a new genus of the *Carditidæ*, *Verticiprionus*. The valves are small, smooth, and capped by a flat prodissoconch. Another new genus, *Incisura*, is erected for *Scissurella lyttletonensis* Smith. This little snail is shown to belong to the *Fissurellidæ*, having characters similar to the very young of *Fissuridea*. The specimens we have examined bear out Mr. Hedley's interesting conclusion. *Incisura* is apparently the most primitive of existing *Fissurellidæ*.—H. A. P.

A NEW *ASHMUNELLA* FROM NEW MEXICO. By Paul Bartsch (Smithsonian Misc. Coll., vol. 47, 1904, p. 13, 14). *A. townsendi*, described from two specimens collected by Mr. C. H. S. Townsend on the slopes of the ridge on the south fork of Ruidoso river, about five miles above the town of Ruidoso, at an altitude of 8,500 ft. This is in the Sierra Blanca, Mescalero Indian Reservation, Lincoln Co., New Mexico. "*Ashmunella townsendi* is most nearly related to *A. rhyssa* Dall, but is much smaller than that form and is uniformly more strongly sculptured." It measures, alt. 8.2, diam. 15, width of umbilicus 2.3 mm., being thus larger than *A. altissima* Ckll. from the summit of Sierra Blanca. From an intermediate altitude, *A. townsendi* seems to be also intermediate in characters between *rhyssa* and *altissima*. The use of the term "axial" to describe obliquely radial sculpture seems rather forced. The direction of such sculpture approaches "axial" only at the periphery, and it is presumed that by "axial" is meant "in line with or in the direction of the axis" as the Century Dictionary expresses it.

SHELLS OF LAND AND WATER: a familiar introduction to the study of Mollusks. By Frank Collins Baker (Chicago, A. W. Mumford, large 8vo). As its title indicates, this book is for the use of those beginning the study of shells, and is especially designed to be placed in the hands of young people interested in nature study, but without much or any previous acquaintance with mollusks. The chapters on The Home of the Clam, Pond Snails, Snails of the Forest and Field, The Oyster and its Relatives, The Cowries, etc., afford an attractive insight into the mysteries of these creatures, and will be a revelation to many intelligent people to whom shells have had no meaning. Eight full-page colored plates are very good examples of the new "three-color process," and illustrate many of our native species besides numerous exotic shells. These figures will help many a learner to some knowledge of common "mantlepiece" shells. The text is also fully illustrated with wood-cuts and half-tone engravings, and a good deal of attention is given to the observation and collecting of mollusks. The work is written in the somewhat old-fashioned form of a series of discourses or monologues by a professor to several pupils. It is well gotten up typographically.—H. A. P.



JOHNSON: PANOPEA BITRUNCATA.

THE NAUTILUS.

VOL. XVIII.

NOVEMBER, 1904.

No. 7.

PANOPEA BITRUNCATA CONRAD.

BY CHARLES W. JOHNSON.

The shell of the genus *Panopea*, like most of the burrowing Pelecypods is subject throughout its growth to considerable variability. The causes of mutation are so admirably described by Dr. Dall¹ that I quote in full the following paragraphs:

“All boring mollusks in which the shell has so degenerated that it no longer covers the whole adult animal when retracted are more liable to variation in minor details than those in which the valves meet distally, and dynamically influence their own development by fixing for it certain definite limits. This is markedly the case in the present genus. Those shells which live in an easily movable medium, such as sand or fine, soft mud, are thinner, better developed, more elongated and less distorted than their congeners who are obliged to confine themselves to a gravelly or stony *situs*. So marked is the difference that I have several times been presented with supposed new species based on these dynamic characters, and by a curious reversal of logic, have been assured that the differences must be specific, because the animals inhabited, respectively, the different kinds of ground alluded to.

“I have observed, also, that where the ground into which the

¹ Contributions to the Tertiary Fauna of Florida, by William Healey Dall. Transactions of the Wagner Free Institution of Science, Vol. III, part IV, page 827. Philadelphia, April, 1898.

burrowers retire is a comparatively thin coating over a stony or rocky layer which they cannot pierce, the tendency in *Panopea*, *Mya*, etc., is for relatively short and broad shells, with shorter siphons, to survive; which naturally have a wider, shorter, and more rounded pallial sinus, and shorter and more incurved nymphs. I believe the influence of environment is direct and not selective; at all events the association of *situs* and specimens so characterized is, as far as I have been able to determine, quite uniform, whether selective or not."

While living at St. Augustine, Florida (1880-87), I was fortunate in finding in the harbor, on a sand bar near "Marsh Island," a specimen of *Panopea bitruncata* with valves intact, and from which the animal had apparently just been removed. This specimen which is shown on plate IV, represents a nearly normal shell (reduced about one-fifth) with the lines of growth but slightly interrupted anteriorly. It had probably grown under favorable conditions in the adjacent sandy-mud bottom. The shell measures 133 mm. (5.25 inches) in length, with a width of 80 mm. On the ocean beach I also found several single valves; these were proportionately shorter, and wider, giving them a more truncated appearance. In my list of the shells of St. Augustine, Florida, in this Journal, Volume IV, page 4, I referred these to *Glycimeris bitruncata* Conr., while in naming the one from the harbor, I followed Dr. Dall's catalogue of the shell-bearing mollusks of the southeastern coast of the United States (Bull. 37, U. S. Nat. Mus.) and called it *G. reflexa* Say.

Since Dr. Dall's review of the species (Trans. Wagner Free Inst. Sci. Vol. III, pl. 4, p. 831), I have made a careful study of the type of *P. bitruncata* in connection with all recent specimens obtainable and find no greater variation than exists in the Pliocene specimens of Florida. The type of *P. bitruncata* is an injured specimen; the upper or dorsal portion of the posterior end being broken away, gives the shell a very oblique truncation, while the lower portion of the anterior has been frequently arrested in its development, the lines of growth being interrupted and crowded together, gives that end also a very oblique outline. The umbonal and younger portion of the shells are alike in all the specimens I have examined.

Uniting the recent and Pliocene forms, and adopting the oldest name will make the synonymy stand as follows:

PANOPEA BITRUNCATA Conrad.

Panopæa americana Stimpson. Check List Shells N. Amer. Smiths. Misc. Coll., Vol. II, 1860; Coues, Proc. Acad. Nat. Sci., 1871, p. 139; not of Conrad 1838.

Glycimeris bitruncata Conrad. Proc. Acad. Nat. Sci. for 1872, p. 216, pl. 7, f. 1.

Panopæa bitruncata Tryon. Amer. Marine Conch., 138, pl. 21, fig. 321, 1874.

Panopæa menardi Heilprin. Trans. Wagner Free Inst., I, 90, pl. 9, f. 19, 1887; not of Deshayes.

Panopæa floridana Heilprin. L. c. I, 91, pl. 10, f. 21.

Panopæa navicula Heilprin. L. c. I, 91, pl. 10, f. 22.

Panopæa reflexa Dall. Bull. 37, U. S. Nat. Mus., p. 70, 1889; not of Say.

Panopæa floridana Dall. L. c. III, pl. 4, p. 831, 1898.

Conrad's type was obtained at Fort Macon, North Carolina; it is also recorded from Cape Lookout, (*Bickmore*); Mobile Point, Miss., (*Conrad*), and the west coast of Florida (*Willcox*). It has also been taken at Crooked Island, Calhoun Co., Fla. (Clarence B. Moore), two specimens measuring 180x109 mm. and 165x112 mm. It is a common species in the pliocene of the Caloosahatchie, Shell Creek, and Alligator Creek, Florida.

The original spelling of the generic name is *Panopea* Menard, 1807. It is *Glycimeris* Lamarek, 1799, (not *Glycymeris* Da Costa, 1778), and *Panopæa* Lamarek, 1812.

NOTES ON EASTERN AMERICAN ANCYLI. III.

BY BRYANT WALKER.

Section FERRISSIA.

III. *Ancylus filiosus* Conrad (1834). Pl. 6, figs. 1-8.

Conrad's description of this species is very meager. No dimensions are given and the only real specific character indicated is "the numerous, radiating, prominent lines." Subsequent authors have supplied no additional information except Haldeman, who gives a figure, though, curiously enough, he states in the text that the species is unknown to him. No specimens from the original locality, the Black Warrior River, have been accessible to me. The only ex-

amples seen are two lots in the Lewis collection, so labelled by him, one from the Coosa and the other from the Cahawba River, Ala., and a set from the latter stream collected by Call. Dr. Pilsbry has kindly compared these with the type specimen in the collection of the Academy and writes that though less strongly striated radially, "they agree with the type in form, and the almost invariably red apex."

As evidenced by these shells, *A. filusus* closely resembles in shape and contour the eastern form of *A. tardus*. It differs, however, in the light green color, the radiating ribs and, when present, the rosy apex. In none of these shells are the ribs very strongly developed, nor do they extend uniformly over the shell from apex to periphery. But there are indications of them on all. They are usually more conspicuous on the sides, especially immediately below the apex and toward the anterior slope, the central portion of the side slope being comparatively smooth. Between these heavier ribs are usually several smaller ones, which seem to be extensions of the apical striae. The larger ribs are heavier and coarser than those noticed in any other species and, when fully developed, would be "very prominent" and conspicuous. The anterior slope is usually strongly convex, although, as shown by the figures, there is some variation in this particular; the posterior slope is nearly straight and direct, not very oblique, and the side slopes are slightly convex. The marginal outline varies from a regular oval to obovate with the greatest width behind the apex.

The Cahawba River specimens are thinner and more translucent than those from the Coosa and are apparently less typical, being less elevated, with the anterior slope more oblique.

The apex is much eroded in all of the Coosa specimens, but is nearly perfect in those from the Cahawba. When perfect it is "somewhat inclined" or rather flattened posteriorly, and very slightly inclined to the right. Binney and Tryon are consequently in error in referring the species to *Acroloxus* (*Velletia*), which is a European group not represented in our fauna.

The dimensions of the specimens figured are as follows:

Fig. 1, length 4.0, breadth 2.9, alt. 1.9 mm.

Fig. 4, length 4.5, breadth 3.5, alt. 2 mm.

Fig. 7, length 4.0, breadth 3.0, alt. 1.75 mm.

IV. *Ancylus parallelus* Hald. (1841). Pl. 5, figs. 1-9.

This common and well-known species has a wide range through the northern states and Canada, extending from Nova Scotia and New England to Manitoba and Minnesota. It is peculiarly a northern form, and its range toward the south is comparatively limited. Rhode Island, Central New York, Northern Ohio and Indiana, so far as the records go, seem to mark the limit. It is not listed from Philadelphia (Shick) nor Alleghany Co., Pa. (Stupakopf), nor Cincinnati (Harper and Wetherby), nor the Chicago Area (Baker).

Mr. Marsh has kindly permitted me to examine the specimens from Mercer Co., Ill., which he quoted as this species in the NAUTILUS III, p. 34, and they prove to be a form of *A. tardus*. Shimek's citation from Iowa City, Ia., which should be verified, if correct, probably marks its extreme range to the southwest, as it does not occur in any of the Iowa lists nor in those of Missouri, Nebraska or Kansas. The tentative citation of this species from North Park, Col., by Ingersoll (Rep. U. S. G. & G. Surv., 1874, p. 405) must also be considered very doubtful.

It is easily distinguished by its narrow, elongated shell, with nearly straight lateral margins, which widen more or less anteriorly. The anterior slope is typically (fig. 1) only slightly convex, but there is considerable variation in this particular; the posterior slope is long, very oblique and nearly straight, the right slope is nearly straight, and the left slope slightly convex. The apex is sub-acute and slightly turned towards the right, and is nearly in the centre of the shell. Lines of growth well marked, but fine and irregular. It is at times subject to considerable irregularity in growth, when living on a small reed, the peritreme is concave at the ends (as noticed in *A. fuscus*) and the lateral slopes are noticeably more convex and the apex less prominent. Several examples have been noticed, in which the shell in the earlier stages was unusually narrow, but on approaching maturity, a sudden expansion of the entire margin took place, resolving the peritreme to nearly its normal outline (fig. 4). Specimens of extraordinary size (fig. 7), far surpassing those from any other locality, have been collected by Nylander at Caribou, Me. Specimens nearly as large ($7.5 \times 4.5 \times 3$) have been collected by Ferriss on the north shore of Lake Superior. Fine specimens larger than the average also occurred in Schuyler's and Little Lakes, N. Y. (fig. 4). In most places, however, the average length is less

than 6 mm. *A. parallelus* is one of the few species of *Ferrissia* that by preference chooses the quiet waters of the inland lakes for its home. In northern Michigan, where it is the only species found, it is abundant on the under surface of the lily pads and on the round reeds (*Scirpus lacustris*), growing in water 3 to 6 feet deep.

The dimensions of the specimens figured are as follows :

Fig. 1. Length 6.5, breadth 3.10, alt. 1.75 mm.

Fig. 4. Length 4.80, breadth 3.25, alt. 1.75 mm.

Fig. 7. Length 8.66, breadth 5.00, alt. 2.50 mm.

V. *Ancylus haldemani* Bgt. (1844). Pl. 6, figs. 9-13.

Haldeman's types of the species, for which he used the preoccupied name of *depressus*, came from the headwaters of the Holston River, in Washington County, Virginia, and are now in the collection of the Philadelphia Academy. Dr. Pilsbry has kindly furnished the accompanying outlines of the larger of the two specimens (figs. 9, 10), and states that "the base is a little raised at the ends, but very slightly so, so that the growth-lines appear nearly straight. There are some coarse radii, especially on the long slope, but not noticeable over the whole surface, but the apical tract is beautifully striate."

I have referred to this species a small series collected by Hempbill in the Doe River at Roan Mountain Station, Tenn. As shown by the figures (figs. 11-13), they agree quite exactly with the type. The specimen figured is decidedly obovate in its marginal outline, the greatest width being behind the apex, but others are more regularly oval.

It is a well-marked form, and, as stated by Haldeman, differs from both *rivularis* and *tardus* in the obtusely rounded apex, which in the Doe River specimens is directed nearly straight backwards. In the type specimen, it is apparently more excentric. There is no indication in the Doe River specimens of the "coarse radii" which are present on the type, but merely a slight rippling of the anterior slope. But this, no doubt, is a variable feature. The specimen figured is slightly longer and proportionately wider than the type; the dimensions being : Length 4.43, breadth 3.33, alt. 1.5 mm.

VI. *Ancylus elatior* Anth. (1855). Pl. 5, figs. 10-12.

Through the kindness of Mr. L. P. Gratacap of the American



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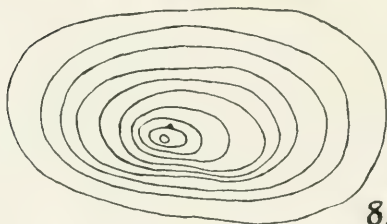
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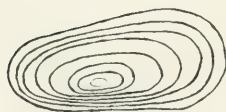
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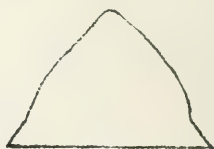
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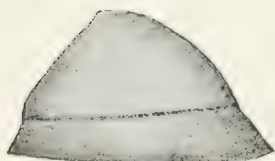
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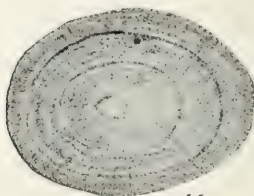
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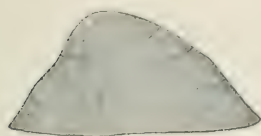
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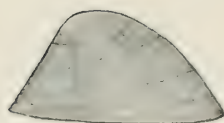
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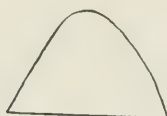
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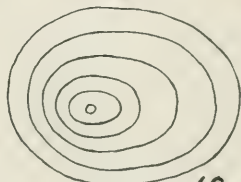
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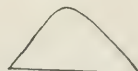
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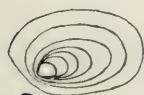
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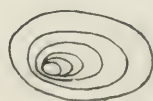
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19.



22.



21.

Museum of Natural History in New York City, I have had the opportunity of examining an author's example of this rare species. This specimen, though not quite as large as the type, agrees with the description in all other particulars. The locality is given as Kentucky and there is but little doubt that it is one of the original lot.

It is a remarkably strong, heavy shell, as compared with the other eastern species, and differs from them all in its size, greater elevation and the convex outline of the posterior slope. The marginal outline is broadly oval, the greatest width being behind the centre and immediately under the apex. The apex is quite acute and turned toward the right. The apical striae are strong and close together at the apex, but rapidly diminishing in size, and the strong, irregular lines of growth on the outer half of the circumference are scarcely more than rippled by the radial lines. The apical portion of this specimen was quite heavily encrusted with lime, which I did not attempt to remove, and which covered up any indications of the rosy color mentioned by Anthony in his description. The irregular shape of this specimen is no doubt an individual peculiarity, caused by a change in the line of growth after a period of rest, possibly a change in the object on which the shell rested. Down to the line where the new growth began, the outlines are quite regular, but below it, there is first a decided constriction, rather more marked in the posterior and left slopes, and then a rapid expansion all around the circumference. Similar instances have already been described as occurring in *A. parallelus*. The dimensions of this specimen are: Length 5.75, breadth 4.5, alt. 3 mm.

Accompanying this shell were two smaller ones of evidently a different species, apparently the same as that found by Hinkley in the Ohio River, and which will be more fully described in connection with that form. In Mr. Hinkley's collection is a single specimen of the genuine *elator*, which was collected by him in a creek near Florence, Ala. The apex is badly eroded, but the rosy tinge is very evident. Its dimensions are: Length 5, breadth 4.8, alt. 2.5 mm.

The outline is entirely regular without any trace of the constriction shown in the Anthonyan specimen.

VII. *Ancylus ovalis* Morse (1864).

I have not been able to get any information in regard to this

species in addition to that afforded by the original description. It is apparently a *Ferrissia* and distinguished from the other northern species by "the delicate ribs which radiate from the apex to the periphery of the shell." Judging from the figure, the shell widens posteriorly and not anteriorly, and the apex is turned to the right and not, as stated by the author, to the left. Whether this be so or not, the broadly ovate shape forbids its reference to the section *Acroloxus* (*Velletia*), made by Binney. Clessin's remark that the form of the apex as shown in Binney's figure recalls the European forms belonging to *Ancylus s. s.* seems equally untenable.

VIII. *Ancylus borealis* Morse (1864). Pl. 6, figs. 14-16.

I have not been able to get any authentic specimens of this species for examination. Its main characteristic is stated by the author to be the "fine regularly interrupted, radiating lines (which) mark the surface of the shell from the apex to the border." Otherwise "the species resembles *A. tardus* in its general form."

The only specimens, at all referable to this species, which I have seen, are those from the St. John's river at Fort Kent, Me., mentioned by Nylander (NAUT., XIII, p. 105), one of which is figured. They are quite close to *A. tardus* and possibly should be referred to that species, but they are narrower and more elliptical than the form of *tardus*, which is apparently prevalent in that State. The growth lines, especially near the apex, are quite strong, and where these are crossed by the apical striæ, the effect is that of "fine interrupted radiating lines," but this is confined to the apical region. The remaining surface of the shell is irregularly rippled in the manner noticed in nearly all the American species. In view of the fact that in many of the species where it occurs, the radial character (except at the apex) is a variable feature, the reference of these examples to *A. borealis* seems fairly justified. The dimensions of the specimens before me are as follows:

Length (fig. 14) 3.75, breadth 2.33, alt. 1.25 min.

Length 3.33, breadth 2.10, alt. 1.25 min.

Length 3.50, breadth 2.00, alt. 1.33 min.

Length 4.00, breadth 2.50, alt. 1.40 min.

Compared with the dimensions of the type, these shells are slightly narrower and not quite as high. But the difference is so slight as to be easily within the lines of individual variation.

The apex is very obtuse, being almost flat on top when viewed in profile.

IX. *Ancylus shimeki* Pilsbry (1890). Pl. 6, figs. 17-19.

1890. *Ancylus obliquus* Shimek. Bull. Lab. Nat. Hist. State Univ. Ia., I, p. 214.

1890. *Ancylus shimekii* Pilsbry. NAUT., IV, p. 48.

Shell elevated, thin, transparent, horn-colored, with a yellowish-brown epidermis; aperture ovate, conspicuously wider anteriorly, in many (especially young) specimens slightly reniform by a barely perceptible incurving of the right margin, the anterior, left and posterior margins regularly rounded, the right slightly incurved, straight, or but slightly convex; apex somewhat acute, elevated, strongly depressed posteriorly and to the right, and curved downward, in most specimens quite overhanging the posterior right margin of the shell; the apical portion of the shell (one-half or more) is strongly laterally, or rather obliquely, compressed, a character which makes the young appear proportionately much narrower than the adults; the posterior slope of the shell is long and strongly convex, the posterior being short and concave. The surface is marked by fine lines of growth.

Largest specimen: Length 3.5, width 1.8, height 1.2 mm.

Average dimensions: Length 2.7, width 1.7, height 1.2 mm.—(Shimek.)

As the Bulletin, in which this species was described, is very scarce and out of print, it seems better to reproduce the original description, which is very full and accurate, than to present a new one. The only specification to be added being that the apex is radially striate.

Through the kindness of Prof. Shimek, I have before me part of the original lot collected by him in Deadman's Run, near Lincoln, Neb. It has also been found at Calloway, Neb., living on *Ceratophyllum demersum* L. In the collection of the Philadelphia Academy a single immature specimen was detected in a vial of *A. rivularis* from the Delaware River at Philadelphia (No. 75811). These are the only authentic records known to me. The tentative reference of this species to *Gundlachia* by Pilsbry (NAUT., IV, p. 48, and IX, p. 63), was based on a misapprehension of the species, which is quite different from the Rock Island, Ills., examples figured by him.

The reference of the specimens from Rock Run, Joliet, Ills., to this species by Baker (Moll. Chic. Area, p. 306), is erroneous for the same reason.

The *A. shimekii* is a very distinct, little species, and, when once seen, is not likely to be mistaken for any other. The high, narrow shell with the rapid expansion towards the base; the prominent, excentric, deflected apex, almost reaching the posterior margin, the long convex anterior slope, and the peculiar posterior slope are very characteristic and separate it from all the described species. It is more nearly related to the small Ohio species, called *pumilus* by Sterki, than to any other, but is clearly distinct as pointed out under that species.

The specimen figured, the largest received from Shimek, is slightly smaller than the average size as stated in the original description, being:

Length 2.66, breadth 1.66, alt. 1.0 mm.

X. *Ancylus pumilus* Sterki (1900). Pl. 6, figs. 20-22.

1894. *Ancylus* ———? Sterki. The L. & F. W. Moll. of New Phila., O., sp. 83, p. 8.

1900. *Ancylus pumilus* Sterki. List of L. & F. W. Moll. of Tuscarawas Co., O., 8th, An. Rep. O. St. Acad. Sci., p. 36. Separate p. 7.

Shell small, thin, translucent, shining, horn-colored; oval or slightly obovate; ends regularly rounded; sides nearly equally curved; apex radially striate, prominent, rather obtuse, not depressed at the tip, about half way between the central and posterior margin and decidedly turned to the right; anterior and left slopes very convex; left slope nearly straight; posterior slope straight below the projecting apex; surface with the lines of growth fine and inconspicuous, more or less irregularly rippled with transverse wrinkles on the anterior slope.

Fig. 20. Length 2.75, breadth 1.75, alt. 1.0 mm.

This minute species, which was first detected in the Tuscarawas River near New Philadelphia, by Dr. V. Sterki, seems to have an extended range. Examples have been seen from the following localities: Alexandria, Va., Seneca, N. Y., Vermilion River, O., Cuyahoga River and Garrettsville, O., and the Mississippi River, Rockford, Ill. Specimens from the Kankakee River, Ill., and Iowa City, Ia., though differing from the typical form in having the

anterior slope only slightly convex, seem to be also referable to this species.

Distinguished primarily by its small size, this species is well characterized by the prominent, obtuse apex, the short, straight posterior slope and long, convex anterior slope. It is very close in general appearance to *A. shimekii*, but seems to differ persistently in having the apex, which is less excentric in position, projecting decidedly upwards and not depressed at the tip as in that species, the anterior slopes not quite so convex, while the posterior slope is longer, more oblique and nearly straight. The extreme lateral compression characteristic of *shimekii* is not present in this species, the right slope being nearly straight; this difference is particularly marked in the immature shells, which in *shimekii* are decidedly narrow and proportionately higher than the mature shell, while in *pumilus* the proportions are nearly the same. Sterki's types are immature examples, to which his statement, that "the sides are parallel," is quite applicable, but in mature examples the lateral margins expand a little and become more curved as shown in the figure, which is from one of the largest specimens seen, the dimensions being:

Length 2.75, breadth 1.75, alt. 1.0 m.m.

EXPLANATION OF PLATES.

All the figures on each plate are drawn on the same scale, but those on Plate VI are somewhat more enlarged than those on Plate V.

PLATE V.

- Figs. 1-3, *A. parallelus* Hald. Little Lakes, N. Y.
 Figs. 4-6, *A. parallelus* Hald. Pine River, Marquette Co., Mich.
 Figs. 7-9, *A. parallelus* Hald. Caribou, Me.
 Figs. 10-12, *A. elatior* Hald. Kentucky.

PLATE VI.

- Figs. 1-3, *A. filiosus* Con. Coosa River, Ala.
 Figs. 4-6, *A. filiosus* Con. Coosa River, Ala.
 Figs. 7-8, *A. filiosus* Con. Cahawba River, Ala.
 Figs. 9-10, *A. haldemani* Bgt. Holston River, Washington Co., Va.
 Figs. 11-13, *A. haldemani* Bgt. Doe River, Tenn.
 Figs. 14-16, *A. borealis* Mse. St. John's River, Me.
 Figs. 17-19, *A. shimekii* Pils. Deadman's Run, Neb.
 Figs. 20-22, *A. pumilus* Sterki. Tuscarawas River, O.

NOTES AND NEWS.

Mr. A. A. Hinkley is making a collecting trip to Alabama.

EDITORS NAUTILUS :

In the course of some remarks on the "Museum Boltenianum," Dr. Pilsbry in the October NAUTILUS refers to the "free use of polynomials" in that work, citing some supposed examples, and suggesting that no one who could "swallow these ought to choke over Chemnitz."

The general question of the acceptability of Bolten's work is too large to enter upon here, and I believe it has been practically settled in a sense adverse to the arguments I used twenty years ago, and which Dr. Pilsbry now reiterates. But the matter of "polynomials" can be settled right here. Bolten used polynomials as much and no more than Linné and Gmelin, 1758-1792. Let us remember that Bolten's work was a posthumous MS. printed without revision by the writer. It contains 2409 entries of species. Of these 64 are what Dr. Pilsbry refers to as "polynomials." (The "*Murex mitra episcopalis*," by the way, is not one of them, and does not occur in the book as far as I can discover; "*Mitra episcopalis*" is there all right.)

Now Bolten's polynomials are partly hyphenated; part of them are words which we now combine in one word (as "*mille punctatum*"); a lot of them are taken from Gmelin or Linné (as "*caput serpentis*," "*lingua felis*," etc.), and have always been in use; others are geographical (as "*Novæ zeelandiæ*," "*Bonæ spei*"), and have also been in use continuously to this day; all of them are either substantive phrases like "*pes-asininus*," or adjective combinations like "*atro-viridis*," which we now use and write as one word. In the whole sixty-four there is only a single case where something like a Chemnitzian polynomial occurs, when to the name of the shell "*sinistrorsa*" is added, indicating that the specimen was reversed. Now exactly such polynomials occur in the work of Linné and most of the older writers after 1758, and have been accepted as valid without demur. Even D'Orbigny as late as 1853 indulged in at least one. While we may regard them as awkward and objectionable, they are not incompatible with the Linnean nomenclature, and have never been so considered.

The polynomials of Martini and Chemnitz, on the other hand, are simply descriptive phrases or brief sentences; the dwindled remnants of the earlier "*nomen triviale*" of pre-Linnean authors, and do not come under the same class as those above cited from Linné and Bolten. In short, with access to the book and a little comparison, Dr. Pilsbry could soon satisfy himself that, on the score of regular nomenclature, there can be no possible objection to Bolten.

WM. H. DALL.

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NEW FORMS OF POLYGYRA FROM ALABAMA.

BY GEORGE H. CLAPP.

Polygyra (Stenotrema) barbata n. sp.

At first glance this species would be readily taken for *P. stenotrema* and as it may exist in some collections under that name it can best be described by comparison with that well-known and widely distributed species.

Viewed from above, the difference is at once apparent, as *barbata* has stiff hairs about $\frac{1}{2}$ mm. in length which are widely spaced, and the diagonal series cross the lines of growth at nearly a right angle. The upper half of the outer lip is well reflected, not appressed as in *stenotrema* and there is a distinct constriction back of it. From below the difference is still more striking, as the width of the mouth in *barbata* is fully double that of *stenotrema*; in *barbata* the width, measured from the top of the tooth to the edge of the lip just below the notch, is 1 mm., while in a *stenotrema* of the same size it is only about $\frac{1}{2}$ mm. The lamelliform tooth is more sinuous and less massive. The flattened upper lip, which is markedly concave, has a well pronounced tooth just opposite the upper end of the abruptly truncated parietal tooth. The "fulcrum," which is plainly visible through the shell, is the most pronounced feature, as it is 3 mm. in length, extending from the axis fully half way across the body-whorl. Embryonic whorls polished and obsoletely ribbed, while in *stenotrema* they are granula-

ted. The granulated embryonic whorls of *stenotrema* and its allies, would seem to make the section *Stenotrema* of at least subgeneric value, although the almost smooth apex of *barbata* indicates that there is some variation in the group. The young of *barbata* are umbilicate. In size there is a wide variation in this species but in all other particulars the characters are absolutely constant.

Greater diam. 11, lesser 10, altitude 7 mm.

Greater diam. 10, lesser 9, altitude $6\frac{1}{2}$ mm.

Greater diam. 8, lesser $7\frac{1}{2}$, altitude $5\frac{1}{2}$ mm.

The average diameter is 9 to 10 mm. Whorls about $5\frac{1}{2}$.

Types from the flood-plain of the Tallapoosa River near the Montgomery Road about five miles southeast of Wetumpka, Ala., in collections of Geo. H. Clapp and Acad. Nat. Sci. Phila.

This most interesting species was first found by Mr. Herbert H. Smith in November, 1903, and he reports it scarce and apparently very local.

On Poole's Island in the Coosa River just below the Georgia line, in Alabama, Mr. Smith found a smaller form of *barbata* which differs slightly in the mouth being still wider and the lip notch weaker. It averages from 8 to 9 mm. diam.

Polygyra stenotrema seminuda n. var.

In the Proceedings of the Academy of Natural Sciences, 1900, page 129, Dr. Pilsbry defines *P. stenotrema* var. *nuda* as follows: "Surface without hairs or their scars; other characters of typical *stenotrema*."

Among the shells collected by Mr. Herbert H. Smith in Central Alabama is a variety of *stenotrema* which differs from *nuda* in having *very short*, widely spaced hairs, in other particulars agreeing with var. *nuda*. As it appears to be a "connecting link," I have called it var. *seminuda*. In size it varies from $5\frac{3}{4} \times 8$ to 7×10 mm., the average diameter being 9 to $9\frac{1}{2}$ mm.; color from greenish-white, almost albino, to dark reddish-brown. Types from Bangor, 4 miles north of Blount Springs, Blount Co., Ala., in coll. G. H. C. and A. N. S. P.

Mr. Smith has sent in three or four apparently well-marked varieties of *stenotrema*, but it will be well to await the conclusion of his work before attempting to define these local races.

NEW SPECIES OF BUCCINUM FROM THE KURIL ISLANDS.

BY H. A. PILSBRY.

Buccinum inclitum n. sp.

Shell ovate-pyramidal, solid, cream-colored with a few inconspicuous reddish-brown stains. The spire is straightly pyramidal, the apex small, the first whorl wanting in the type specimen. 8 whorls remain; they are very convex and separated by deep, channelled sutures. Below the suture the flattened, sloping surface is sculptured with four or five spiral cords. These are followed by three very strong spiral ribs, separated by deep striate intervals. On the last whorl there are four large ribs, grouped near the periphery, which is formed by the second rib; below them the base has about 8 gradually decreasing spiral cords, with one to three smaller cords and threads in each interval, exclusive of those on the convex, siphonal fasciole. Over the whole of this sculpture there is a very fine spiral striation, and the upper slope of the whorls has small radial waves, making the ribs slightly nodose. The aperture is tinted with pale yellow on both lips, the outer lip being somewhat expanded, and posteriorly flaring. The anterior canal is short and wide.

Length 82, diam. 46 mm.

Etorō, Chishima [Kuril Is.]. Type is no. 88768 A. N. S. P., from no. 1704 of Mr. Hirase's collection.

This noble and beautiful species is somewhat related to *B. leucostoma* and *B. martensianum*, but it is much more strongly sculptured than either. *B. carinatum* Dkr. is also related, but it differs by the small number of spiral keels.

Buccinum chishimanum n. sp.

Shell ovate, rather thin but moderately solid, yellowish olive-green, the principal spiral ribs typically red-brown with light spots. Spire slate-blue or ashy-purple. Whorls 6, the apex slightly mamillar and smooth, the last whorl ventricose, sculptured with numerous very unequal spiral cords and threads, the larger cords widely spaced on the upper half, more numerous below. Over all there is a microscopic sculpture of distinct, fine and close fold-like growth-striae, and very fine, subobsolete spiral striae. The suture is bordered with weak folds, sometimes stronger and tubercular. The

aperture is half-round, glossy, dark chestnut-brown inside, the bevelled and slightly expanded lip cream-white. The basal notch is rather wide and not very deep.

Length 31, diam. 20 mm.

Etorō, Chishima (Kuril Is.), types no 87757 A. N. S. P., from no. 1597a of Mr. Hirase's collection.

This whelk seems to be related to the smaller, thinner and smoother *B. mörchianum* (Fischer), but the two are quite distinct. In some specimens the coarser spirals are all low, subequal and almost evenly distributed over the surface. As usual in *Buccinum*, the coarser sculpture is variable. Some specimens lack the thin, greenish cuticle, being dull, creamy-ashen, like many arctic shells. There is always a livid or purplish worn spot in front of the aperture.

ON THE NORTHERNMOST HABITAT OF *LIGUUS FASCIATUS* ON THE FLORIDA EAST COAST.

BY CLARENCE B. MOORE.

These snails at the present writing (1904), live in great abundance at Miami, Dade Co., Florida. They were found by me in small numbers at Arch Creek, about nine miles north of Miami. Going northward I found them, here and there, along the banks of New River, below Ft. Lauderdale about 24 miles, in a straight line, north of Miami.

North of this point inquiries were made along the banks of the canal where "hammock" land (such as *Liguus* requires) is often in sight, but in no case had the snails been seen by the inhabitants. At Boca Raton, Dade Co., the hammock is not large, and much undergrowth has been burned recently. We saw no living *Liguus*, nor any of their shells on the ground. *Glandina* was present and various shells of other kinds.

Occasionally among the Keys, south and east of the peninsula, the statement was made to me by persons I met, that occasional snails of this species had been seen by them as far north as Lake Worth.

A number of inhabitants living about six miles south of Lake Worth had never seen the snails. Around the southern end of Lake Worth there is much fine hammock, where the vegetation seemed expressly made for *Liguus*, but a careful search made by my party

yielded no evidence of these snails on the trees or of their shells on the ground. *Glandina* and many smaller snail shells were found.

When I reached Palm Beach, on Lake Worth, I called on a dealer in shells, who told me he had sold many *Liguus* from Miami, but had found none around Lake Worth. He said he had placed a number of snails from Miami around Lake Worth, in the hammock, but the snails died.

At present, therefore, New River is apparently the northern limit of *Liguus* on the East Coast; and satisfactory evidence is lacking that it ever extended further north.

NEW LAND SNAILS FROM NORTH CAROLINA.

BY H. A. PILSBRY.

Polygyra appressa tryoniana n. subsp.

The shell is imperforate, similar in shape to *P. appressa*; rather dark greenish-brown; very glossy. Sculpture on the last 4 whorls of regular, fine, curved riblets, which are slightly narrower than their intervals, and fine engraved spiral lines, more prominent in the intervals than on the ribs. The first (embryonic) $1\frac{1}{2}$ whorls are densely sculptured to the apex with obliquely radial striae, followed by a small fraction of a whorl with coarser, irregular striae before the riblets set in. Spire convexly conic. Whorls $5\frac{1}{2}$ to $5\frac{3}{4}$, slowly increasing, the last somewhat angular at the periphery in front. The suture descends slightly to the aperture. The aperture is very oblique, somewhat "dished." The peristome is very wide, strongly thickened within, contracting the aperture, and broadly, flatly reflexed; white, with a fleshy outer border in all but old shells. The back of the lip is bright yellow, this color spreading to form a triangular spot at the suture. A stout, strongly curved parietal tooth stands on the parietal wall.

Alt. 11, diam. 17.5 mm.

Alt. 10.5, diam. 17 mm.

Tryon, Polk Co., North Carolina. Types no 88769 A. N. S. P., collected by H. A. Green.

This form resembles *P. appressa perigrapta* in sculpture and shape, although a little less depressed than that form. It differs in the wider peristome, which contracts the aperture more, and in the

basal lip, which lacks the long tooth of *appressa* and *perigrapta*, or has only the slightest vestige of it. *P. a. tryoniana* differs from *P. wheatleyi* in the more depressed body-whorl with a tendency to angulation, the larger parietal tooth and especially in the sculpture. *P. wheatleyi* has small sharp raised points scattered over the upper surface and in the more delicate specimens upon the base also, and while some spiral lines may be seen on the base in some specimens, they are very weakly developed. In *P. tryoniana* there is no trace of hair-bases or points, the sculpture being like that of *P. appressa perigrapta*.

Polygyra wheatleyi clingmanica n. subsp.

Shell small, thin and fragile, somewhat transparent, pale. The glossy surface is set throughout (except near the apex) with short delicate hairs, readily removed and often in large part lost from old or cleaned shells. The rib-striae of the typical form are much weakened or nearly effaced. Lip narrow, no parietal tooth. Alt. 8.7 diam., 13 mm.

Near the summit of Clingman Dome, Great Smoky Mountains. Types no. 77616 A. N. S. P., collected by Messrs. Ferriss, Clapp, Walker, Sargent and the author, 1899.

This form was noticed by me, Proc. A. N. S. Phila., 1900, p. 127. It seems sufficiently differentiated from the typical form of *wheatleyi* from Cherokee Co., N. C., from the more solid form prevalent in the Great Smoky Mts., generally, and from the form of Roan Mt., to require a special name. It was found from the summit of Clingman Dome to our camp at the "Balsams," near the western end of the mountain. Lower down, the ordinary *P. wheatleyi* replaces it. It is analogous to *P. andrewsæ altivaga*.

AGRIOLIMAX AGRESTIS IN COLORADO.

BY T. D. A. COCKERELL.

To-day, October 25, 1904, I was surprised to find *Agriolimax agrestis* in abundance in a vacant lot in the town of Boulder, Colorado. This is the first indication of the establishment of this slug in the Rocky Mountain region. The specimens are much darker than those one ordinarily finds in England, and those I collected are referable to the following mutations:

(1.) *Mut. rufescens*, Dumont and Mortillet. Reddish, without any distinct spots or lines. Sixteen specimens.

(2.) *Mut. brunneus*, Taylor. Very dark-brown; one or two are so nearly black that they could be taken for *mut. niger*, Morelet. Eight specimens.

(3.) *Mut. semirufus*, nov. Head and mantle rufous; body posterior to mantle almost black. Two specimens. This indicates that the coloration of the head and mantle, and that of the body, may be separately inherited, though more frequently the color of the animal above is uniform.

The common English forms *pallida* Schrenk, and *reticulata* Müller, are absent.

MARGARITANA MARGARITIFERA IN PENNSYLVANIA.

BY CHAS. H. CONNER.

A few weeks ago, I had the pleasure of receiving a few specimens of *Margaritana margaritifera* Linnaeus, which were taken from Still Creek, near Quakake, Schuylkill Co., Pa. As I believe this species of fresh-water mussels has not been reported living in Pennsylvania, I send you this note.

Mr. Frank M. Ebert, who kindly forwarded the specimens to me, states that they are found in the several streams of the vicinity. He and others have taken a great quantity of pearls of all sizes and grades from them. Though Mr. Ebert has collected the species for some time, he informs me that he has never found a gravid specimen.

The foot and gills of the specimens examined are brownish, the rest of the body being white.

NOTES AND NEWS.

ARION CIRCUMSCRIPTUS, JOHNS. (FASCIATUS NILSS., *pars*).—Last June I found this European slug in abundance on Goat Island, Niagara Falls, N. Y. It appears to be an addition to the fauna of New York, but Dr. N. L. Britton, to whom I mentioned the occurrence, said he was sure he had heard some report of it. The specimens were of the usual grey color, with narrow bands and a slight keel. In 1887 I searched the same locality, but at that time the *Arion* was apparently absent.—T. D. A. COCKERELL.

ALBINO POLYGYRA MONODON AND *P. hirsuta*.—I am sending the white (albino) form of *Polygyra monodon*, which I have found this season near Des Moines, Iowa. This white form is associated with the ordinary brown ones, but I never find *P. monodon* near *P. monodon fraterna*. *P. m. fraterna* and *P. hirsuta* I find associated. I also have a few white *P. hirsuta*.—T. VAN HYNING.

GEOGRAPHIC RANGE OF POLYGYRA TRIDENTATA DISCOIDEA IN INDIANA.—I send you to-day specimens from Charlestown Landing and Mt. Vernon of *P. tridentata discoidea* Pils. It seems that this variety extends across the whole width of the State, for Charlestown Landing is 50 miles above Louisville, Connelton, the original locality of the variety, is 75 miles below, and Mt. Vernon is but a little way above the Illinois line, where the Wabash river joins the Ohio. At all of these places the variety occurs on the immediate banks of the Ohio river, but when you go back into the country you get the typical *tridentata*.—L. E. DANIELS.

PUBLICATIONS RECEIVED.

PHYLOGENY OF FUSUS AND ITS ALLIES. By Amadeus W. Grabau (Smithsonian Miscellaneous Collection [no. 1417] part of Vol. XLIV, 1904).

This work represents a great amount of investigation and careful study. A pupil of the late Professor Hyatt, the author has applied the principles of development, parallelism and acceleration in defining genetic boundaries. In this group the author considers the protoconch and nepionic stages of the conch to be the most important, although not always to be relied upon. Parallelism is constantly cropping out, "but parallelism is no guide to affinity, and hence grave mistakes in classification are made, unless this fact is borne in mind. Parallelism is much more potent in the later stages of development than in the earlier ones, although it is by no means unknown in these latter." This and the following quotation briefly define the author's views:

"The Fusidæ as a group are highly accelerated, and near the acme of development. Primitive types are uncommon, except in the eocene and even there regressive species appear. The majority of species have attained the acme of development for the group, many

of them reaching it while still young. * * *Fusus colus*, the type of the genus, is itself a regressively accelerated type, in which the characteristic aematic features have nearly disappeared in the adult. Excessive degradational acceleration is seen in *Cyrtulus*, *Clavilithes* and similar genera."

In the eocene of the Gulf States there is a group of shells having the form of a true *Fusus* but with a protoconch similar to many species usually referred to *Pleurotoma*. For such shells the new genus *Falsifusus* is proposed. Type: *Fusus meyeri* Aldrich (not Dunker). I beg to differ with the author in using *F. meyeri* Aldr. *Fusus meyeri*, being preoccupied, becomes a synonym and remains a synonym; the name of *F. ottonis* Aldr. proposed in its stead should be adopted.

For two forms (*Fusus quercollis* and *F. rugatus*) from the lower eocene of Alabama, the name of *Fulgurofus* is proposed. The protoconch is Fulguroid. The new generic name of *Heilprinia* is given to a number of recent and late tertiary fusoid shells from the Antillean region and Florida. "They differ from *Fusus* in the very remarkable, strongly accelerated protoconch, which is throughout its greater portion crossed by riblets." Type: *Fusus caloosaensis* Heilp.

Under the head of Phylogerontic Fusidæ is placed the peculiar *Cyrtulus serotinus* Hinds. Its genetic relation to *Clavilithes* is disputed; in its young stages it is a typical *Fusus*, but in the adult the whorls become thick and loosely wrapped about one another; this type of structure is designated as Melongenoid. To the eocene forms which most closely resemble *Cyrtulus*, the new generic name of *Clavellofus* is given. "Genotype: *Clavellofus spiratus* sp. nov." Under this genus are described three new species from the Paris Basin, forms which are considered by most authors to be only variations of the variable *Clavilithes longævus* Lam. The author seems to have had very few specimens showing the protoconch on which to base such novel conclusions. Under the genus *Clavilithes* several new species are described, including *C. solanderi*, based on the *Murex longævus* Solander (in part) and including specimens figured by Sowerby. (Mineral Conch. I, 141, tab. 63, f. 1, 1812). It may be of interest to know that this identical specimen is in the collection of the Academy of Natural Sciences, Philadelphia. It was presented to the Academy by Dr. Thos. B. Wilson, who purchased it

in Europe many years ago, together with several others illustrated in the same work.

For another new genus derived in part from the genus *Clavilithes* of authors, the name of *Rhopulithes* is proposed ("Genotype: *Fusus* *noæ* Lamarek"), while three new species have been found in the gleanings from the Paris Basin. The generic name of *Cosmolithes* is proposed for *Fusus uniplicatus* Lam.

It is not easy to define the true position of many of the genera. Whether a Pleurotomoid or a Fulguroid protoconch should remove a shell in every other respect a *Fusus*, from the family, or what position a shell with the protoconch of a *Fusus*, but with the form of a *Hemifusus*, should occupy, the author has not always clearly defined. A table of genera showing their relative position to allied forms would have been very useful and would more readily convey to students the author's conclusions.

The work contains 192 pages, including 18 plates. The two plates of protoconchs are exceedingly fine, but the half-tone plates could be improved upon.—C. W. J.

STUDIES ON AUSTRALIAN MOLLUSCA. Part VIII. By C. Hedley. With a Note on *Terebra Hedleyi* Tate. By Edgar A. Smith (Proc. Linn. Soc. N. S. Wales, Pt. 1, 1904, pp. 182-212, plates 8-10). The author has again brought forward some changes in nomenclature that should be adopted. The *Strombus urceus* Linn. = *S. floridus* Lam. The species commonly known as *S. urceus* L. is rightly *S. ustulatus* Schumacher. *Acmæa octoradiata* Hutton 1873, should be used in place of *A. saccharina* Linn., var. *perplexa* Pilsbry, as suggested by Dr. Pilsbry. A new genus *Stiva* and 14 new species are described. *Lima sydneyensis* is proposed in place of *L. brunnea* Hedley not Cook.—C. W. J.

NOTES ON THE GENUS SONORELLA, WITH DESCRIPTIONS OF NEW SPECIES. By Paul Bartsch. (Smithsonian Miscellaneous Collections, vol. 47, part 2, Oct. 10, 1904.) This study deals with a group of Southwestern Helices, nearly all of which have been described since 1890; and the foundation of the genus dates only from 1901. To the anatomical characteristics already known, Mr. Bartsch adds a very useful conchological generic character, distinguishing the genus from *Epiphraugmophora*: the shell of *Sonorella*

never has incised spiral lines. The species are shown to fall into groups according to the sculpture of the embryonic shell; the characters and distribution of all of them are discussed more or less fully, and the following new forms are described: *S. ashmuni*, *S. dalli*, *S. baileyi*, *S. baileyi orcutti*, *S. fisheri* from the United States, and *S. nelsoni*, *S. goldmani*, *S. merrilli*, *S. meurnsi* from adjacent states of Mexico. Six plates of illustrations represent all of the known species and typical examples of the apices; all being reproduced from photographs.

There will probably be some difference of opinion about the rank given to the several forms described as species; but whether they be ultimately ranked as species or subspecies, Mr. Bartsch's careful work in discriminating the numerous forms gives the paper a high value. It ought to be mentioned that the use made of Hyatt's terms of growth is almost throughout erroneous; but as this is in the present case a mere question of descriptive terms, it does not seriously detract from the value of the essay.—H. A. P.

A NEW SPECIES OF AMPHIDROMUS. By Paul Bartsch (Smiths. Misc. Col., vol. 47, pp. 292-3). *A. gossi*, from Mount Kin Baloo, North Borneo, is described and figured. It is probably a color-form of *A. pictus* Fult., also described from Mt. Kina Balu, and a very variable species, as the specimens I have seen demonstrate.—H. A. P.

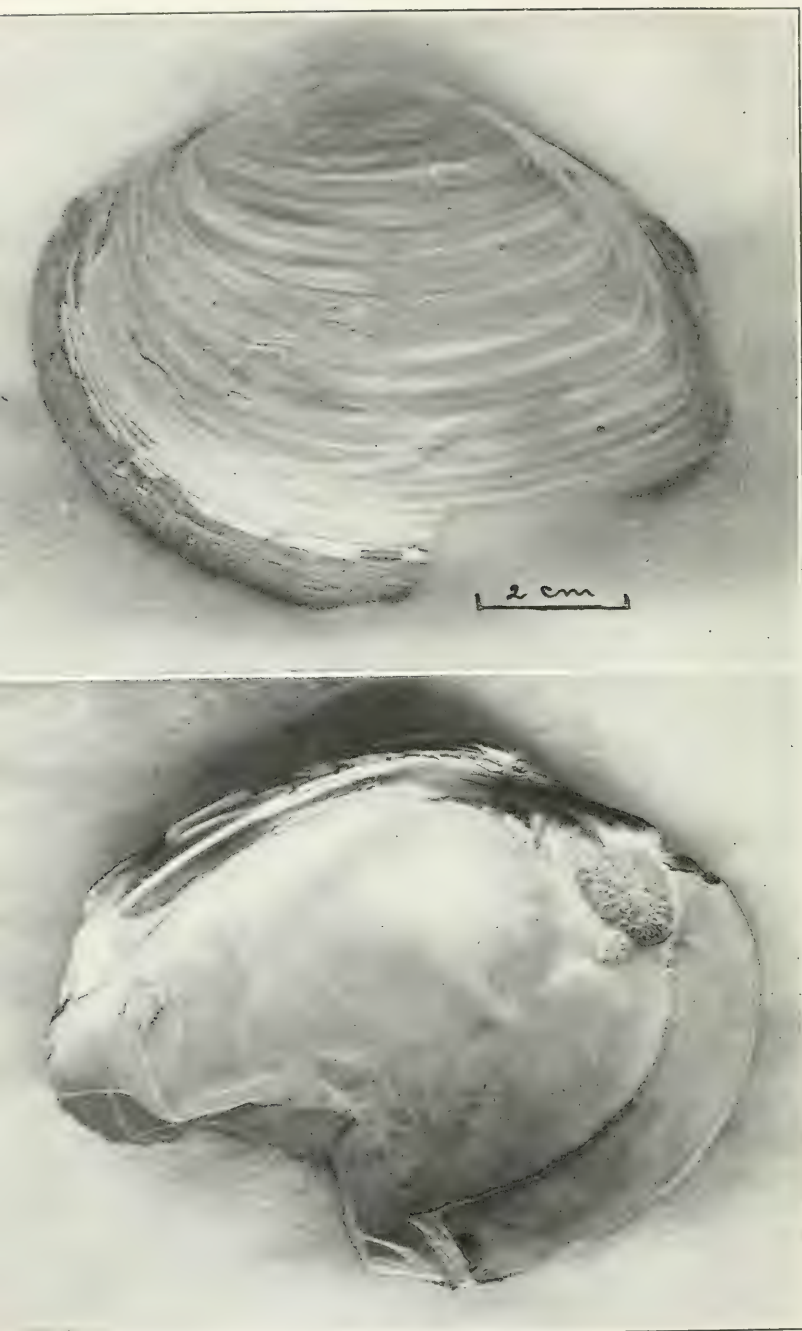
WEST AMERICAN SHELLS. By Josiah Keep, A. M. San Francisco, 1904. Pp. 360, 304 figs. Twenty-three years ago Professor Keep published a modest little book, "Common Sea-shells of California." This was the first successful attempt to popularize the study of American mollusks. It was followed in 1887 by a more extended book, "West Coast Shells," which also met with a cordial welcome from advanced students and beginners in nature study alike.

The edition of this book being exhausted, Professor Keep has prepared a more extended work including descriptions and figures of many more species, and a list of West Coast and Rocky Mountain Mollusca. The descriptions are simply worded, and being supplemented by several hundred figures in the text, enable the western student to identify and learn something of nearly all the shells likely

to be encountered in ordinary shore collecting, or dredging in moderate depths. Lovers of shells everywhere, even those not interested in Pacific shells, will delight in the simple and direct English of the book, and will find their knowledge of mollusk-life broadened by it. There is a contagious enthusiasm in its pages.

So much good must be said of Professor Keep's book that we hesitate to mention any defects. On p. 152, *Physa* "*columbella*" is a misprint for *P. columbiana*, and *Aplexa* is misspelled. Fig. 136, on p. 154, is apparently *Planorbis binneyi*. *Ancylus subrotundus* is a species of *Lanx*. Fig. 103, on p. 123, is *Oreohelix haydeni*, not *strigosa*. The species *striatella* and *cockerelli* are not *Oreohelices*. Figs. 119 are not *Ashmunella levettei*. Various other errors occur among the land shells. There are many wrong authorities given for specific names, and the list at the end contains a great many errors and entries of the same species under two or three names which might have been avoided by submitting it to specialists on Molluscan nomenclature. Such a check, to pick up loose ends, is necessary in a work covering so wide a field, for part of which the author must rely on published data of various periods and various degrees of perfection. Fortunately many of the errors occur in the list, rather than in the main text of the work, which aside from these defects deserves all the praise we have given it.—H. A. P.

THE CYPRÆE OF THE PERSIAN GULF, GULF OF OMAN, AND NORTH ARABIAN SEA. By Jas. Cosmo Melvill and Robert Standen. (Jour. of Conch. XI, pp. 117-122, Oct., 1904.) About 35 species and varieties are recorded, including the following new varieties: *Cypræa caurica* L. var. *cairnsiana* nov. "This variety which we dedicate to Mr. Robert Cairns * * * is precisely to the typical form of *caurica* what *coloba* Melvill (= *gregori* Ford) is to *cruenta*." *C. ocellata* L. "var. *pelidna*, a pale, pinkish-livid or grey shell, from Karachi, is most peculiar and remarkable. In form and marking it is as the type; the basal lineations are faint, but normal. The color, however, shows no trace of brown." *C. pulchella* Sowb. var. "*pericalles* nov. Shell uniformly smaller (32 mm.), very polished, in form like the type, dorsal markings similar, and as variable, with occasional dark sepia blotches, more or less distributed in various examples, * * * Kiener figures the var. *pericalles* (Genre Porcelaine pl. xxiii, f. 2a), mentioning it as the young form (p. 26). Our specimens, twelve or more in number, are, however, mostly adult, exhibiting a dwarf race of this very beautiful and still uncommon species."—C. W. J.



WAGNER: FOSSIL UNIO CRASSIDENS FROM WISCONSIN.

THE NAUTILUS.

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No. 9.

ON AN INTERESTING FOSSIL UNIO FROM WISCONSIN.

BY GEORGE WAGNER.

A little over a year ago Mrs. George Marston, of Quincy, Illinois, presented to the University of Wisconsin the mollusca brought together by her late husband, an ardent and an able collector of our Wisconsin forms. The collection was placed in my hands for arrangement. In looking it over I was immediately attracted by a single somewhat broken valve of a *Unio*, evidently fossilized, and the only fossil form in the collection.

Mrs. Marston had very kindly, and very wisely, sent with the collection all of her husband's correspondence relating to it. In looking over the letters I came across a copy of one written by Mr. Marston, and containing the necessary locality data for this shell.

According to this letter the shell was found about 1889 in the city of Green Bay, Wisconsin, during excavations for the city water-works reservoir. It came from a depth of about fifteen feet below the surface, and presumably from the till.

As Mr. Marston well knew, the shell is wholly unlike any Unionid now found in Wisconsin. It is a left valve, quite heavy but very brittle. When found, the outer surface still retained most of the epidermis, but this has almost entirely disappeared. The height is 70 mm., the breadth of the single valve approximately 22 mm.

The shell when complete was very evidently smooth, with a rather elliptical outline. The wall is thick but thins down considerably

toward the posterior end. Anterior margin incrassate. Posterior dorsal curve regular and strong. Posterior umbonal slope flattened, and separated by a decided angle from the lateral slope. There are some traces of waviness on this posterior slope. The umbones are not very prominent and but very slightly incurved; the ligament long and heavy. The cardinal teeth, though much weathered, were evidently short and heavy, the lateral teeth long and nearly straight. The anterior adductor cicatrix is large and deep, strongly pitted; the protractor impression triangular. The pallial cicatrix is very deep, and crenulate. Only a small portion of the posterior cicatrix remains.

On comparing the valve with the Unios in our collection, I am forced to the conclusion that we have here a specimen of *Unio crassidens* Lam. I am further strengthened in this belief on comparing the specimen with the figures and description of *U. crassidens* by Call (a study of the Unionidæ of Arkansas, etc.—Trans. Ac. Sciences, St. Louis, Vol. VII, pp. 1-65, plates I-XXI). Finally I have compared it with two specimens of *U. crassidens*, one from the Ohio river, the other from southern Michigan, which were kindly sent to me for this purpose by Dr. W. S. Strode, of Lewistown, Illinois. It may be that further material will force us to recognize it as a separate variety, but I do not think it probable.

Now let us consider the present distribution of *U. crassidens*. According to Call (*l. c.*) it is abundant in the Cumberland river of Tennessee as well as in other rivers of that State. It occurs abundantly also in the Coosa and the Alabama, in the Tombigbee, and southeast to the Chattahoochee (Simpson, Synopsis of the Naiades, Proc. U. S. Nat. Mus., Vol. XXII, pp. 501-1044). It also occurs in the Mississippi and its eastern tributaries as far north as the forty-second parallel; or, in general, to northern Illinois and southern Michigan. It does not occur within the Basin of the Great Lakes, neither has it ever been found in any stream west of the Mississippi so far as I know. We must look upon it then as essentially a southeastern form, with its center of distribution lying probably somewhere in the rivers of Tennessee.

We are thus confronted with the problem of its occurrence, in fossil form at Green Bay, in the St. Lawrence Basin. It is because this involves an interesting point in the causes affecting present geographical distribution, that this note is written.

One of the marked topographic features of Wisconsin is a long diagonal valley extending from Green Bay, and really as a continuation of the basin of this bay, toward the southwest. It follows the basin of Lake Winnebago and the course of the Fox river. In the neighborhood of Portage it overrides the water-shed, and is continued in the valleys of the Wisconsin and the Rock. At Portage the Fox and the Wisconsin are less than two miles apart, and in Spring become confluent, the upper Wisconsin contributing largely toward the floods of the Fox (Irving, *Geology of Wisconsin*, Vol. II, pp. 418, 419).

Now, according to Irving (l. c. p. 426), it is very probable that in preglacial times the entire area of the Fox river drainage, including the basin of the Wolf, far north of Green Bay, was drained by the Wisconsin, or a stream occupying approximately its bed. Given this former unity of the Fox and the Wisconsin drainage, the occurrence of a Mississippi form as a fossil in Green Bay is made clear, even though this form be now a southern one. For it must be remembered here that southern forms in general had a decidedly more northern distribution before the Pleistocene, and especially before the Pliocene.

How as to its disappearance? We know that during the Pleistocene the northern part of our hemisphere became ice-coated nearly as far south as the Ohio river. One of the lobes of this great ice mass entered this very same Green Bay—Wisconsin Valley—and plowed through it nearly its entire length:

It is evident that this enormous ice mass swept everything living before it, or buried it beneath, and *Unio crassidens* had to go with the rest.

When the ice finally receded the conditions were so changed as to forbid the establishment of previous faunal conditions. In the first place, the drainage of the Fox was now separated from that of the Wisconsin. But more important, the climate of this region had become so much colder that many of the former inhabitants, *U. crassidens* among them, seem not to have been robust enough to regain even such part of their former territory, to which the waterway was freely open. Finally alteration in tension between various species probably also contributed to the same general result.

It is highly desirable that the Unionids, as well as other mollusca found on both sides of the divide between the Mississippi and St.

Lawrence Basins be much more completely studied, especially in regions where the divide is narrow. Together with this we need to obtain and study the fossil forms of the Tertiary and Pleistocene. Thus and thus only can we get a much more accurate and detailed knowledge of the effect of the Glacial Period on the distribution of animals.

Plate VII. External and internal views of fossil *Unio crassidens* from Green Bay.

University of Wisconsin, Zoölogical Laboratory, November 29, 1904.

ON THE SPECIES OF *MARTESIA* OF THE EASTERN UNITED STATES.

BY CHARLES W. JOHNSON

Three species of the genus *Martesia* are found on the eastern coast of the United States. They are more abundant south of Cape Hatteras, becoming less common or rare to the northward. Like most burrowing shells they are subject to considerable variation. There is also a great difference in appearance between the young and adult shell, the large anterior gape of the young being closed in the adult by a calcareous deposit called the "callum" attached to either valve and extending to the middle or lower edge of the valve.

The shell has a large protoplax and a narrow elongated metaplast and hypoplast; mesoplast and siphonoplast wanting; valves with a single radial sulcus. The species can readily be distinguished by the form of the protoplast, which though showing slight variation, probably due to a favorable or unfavorable *situs*, is quite constant in its general character.

MARTESIA STRIATA (Linn.). Fig. 1.

Pholas striata Linn., Syst. Nat. 12 ed. 1111, 1767.

Pholas pusilla Linn., Syst. Nat. 12 ed. 1111, 1767.

Pholas nana Pultney, Dorset. Cat. p. 27, 1799.

Pholas falcata Wood, Gen. Conch. t. 16, f. 5-7, 1815.

Pholas clavata Lam., Anim. s. Vert. V. p. 446, 1818.

Pholas conoides Fleming, Brit. Anim. p. 457, 1825.

Pholas Hornbeckii Orb., Historia Fis. Polit. y Nat. de la isla de

Cuba, Moluscos, p. 282, pl. 25, f. 23-25 (1845); and in the French edition, p. 217, pl. 25, figs. 23-25, 1853.

Pholas semicostata H. C. Lea, Proc. Bost. Soc. Nat. Hist. I, 204, 1844; Boston, Jour. Nat. Hist. V, p. 285, pl. 24, f. 1, 1845.

Pholas terediniformis Sowb., Proc. Zool. Soc. 1849, p. 161.

Pholas Beauiana Recluz, Jour. Conch. IV, p. 49, pl. 2, f. 1-3, 1853.

Pholas corticaria Sowerby, Thes. Conch. II, 495, pl. 108, f. 94-96, 1855.

Martesia striata Tryon, Mon. Pholadacea, p. 92, 1862.

Martesia corticaria Tryon, Mon. Pholadacea, p. 92, 1862.

Shell narrowly wedge-shaped, thin, anterior truncated, cordate, with sinuous elevated crenulated ridges, showing slight radial sculpture anteriorly; radial sulcus slight; the posterior portion marked only by somewhat irregular concentric undulations or growth lines; callum smooth, and angulate at the line of attachment; the protoplax normally three-lobed, those of the sides sometimes wanting in the smaller specimens, giving the protoplax a "halberd-shaped" appearance as shown in the figure of *P. corticaria* Sowb. Length, 8-23 mm.

Distribution, South Carolina, Florida and the West Indies, Europe, Japan (Dunker), Philippines (Cuming). It was described by Linnaeus from southern Europe, while to the West Indian shell he gave the name of *P. pusilla*. The slight radial sulcus and angular margin of the "callum" of *P. semicostata* H. C. Lea, shows that it is undoubtedly a synonym of this species. *P. terediniformis* and *P. falcata*, as stated by Tryon, are only the young of this species. *P. Hornbeckii* Orb., also comes under this category. The type of *P. corticaria* was found in a piece of cast-up mahogany.

Through the kindness of Mr. J. J. White, of Rockledge, Florida, I received an interesting series varying in size from 8-21 mm. long. They were collected at Oceanus, Florida. These specimens were also found in drift-wood, a feature which undoubtedly accounts for the wide distribution of this species.

MARTESIA CUNEIFORMIS. (Say). Fig. 2.

Pholas cuneiformis Say, Jour. Acad. Nat. Sci. II, p. 322, 1822.

Martesia cuneiformis Tryon, Mon. Pholadacea, p. 91, 1862.

Shell broadly wedge-shaped, anteriorly truncate, cordate; with broad sinuose crenulated ridges, the anterior crenulations forming

radial costae; near the deep radial sulcus the crenulations are wanting, and beyond the sulcus are merely concentric undulations or growth lines, callum smooth, line of attachment rounded, cordate; protoplax arrow-shaped with a medial depression and oblique striae. Length, 14-18.

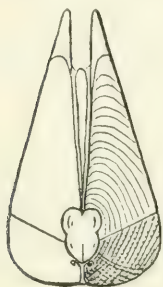


FIG. 1.

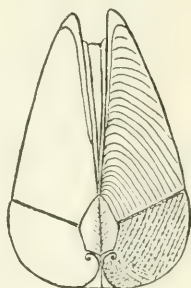


FIG. 2.

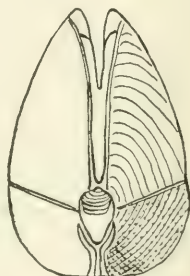


FIG. 3.

Connecticut to the West Indies. Near New Haven, Ct., in oyster shells (Perkins); Holly Beach, N. J. (Ford); Oceanus, Fla. (White), and found by the writer at St. Augustine.

Subgenus *DIPLOTHYRA* Tryon, 1862.

The protoplax and also the metaplax are bordered by an elevated callous margin; in the former case obliterating the deep depression in front of the umbones. Metaplax and hypoplax divaricating. Tryon considered the sculptured and smooth portions of the protoplax as a "double accessory valve," and on that character founded the genus *Diplothyra*. The above characters seem to separate it subgenerically from the typical *Martesia*.

MARTESIA (*DIPLOTHYRA*) *CARIBÆA* (Orbigny). Fig. 3.

Pholas caribæa Orb., *Historia*, etc., p. 281, pl. 25, f. 20-21, 1845. French edition, p. 211, t. 25, f. 20-21, 1853.

Diplothyra Smithii Tryon, *Proc. Acad. Nat. Sci.* 1862, p. 450; *Mon. Pholadacea*, etc., p. 126, pl. —, f. 2, 1862.

Shell broadly wedge-shaped, inflated anteriorly and tapering abruptly towards the posterior; the anterior half with fine wavy lines forming slight radial costae, radial sulcus quite prominent, posterior half marked only by small concentric undulations and growth lines;

the form of the protoplax is variable and the sculptured portion often very irregular or obsolete; callum round and tumid. Length, 9-17 mm.

New York to Florida, Cuba and Texas. Tottenville, Staten Island, burrowing in oyster shells (Tryon).

Although the figure given by d'Orbigny lacks the protoplax, the raised callus border surrounding it is clearly defined, while his description of the protoplax—"Ovato-oblonga, antice producta, acuta uncinata, postice dilatata angulata," agrees with what has been considered *D. smithii*. During my residence at St. Augustine (1880-87), I found a large number of fine specimens in a piece of soft artificial limestone off the water battery of Fort Marion. In my list of the shells of St. Augustine (THE NAUTILUS IV, 4) I confused this with *M. cuneiformis*. This species has only been recorded from shells and limestone while *M. striatus* and *cuneiformis* are more frequently found in wood. Its occurrence as far north as New York is probably accidental.

NOTE ON THE NOMENCLATURE OF THE SNAILS USUALLY CALLED PUPA.

BY T. D. A. COCKERELL.

Since it appears that the name *Pupa* is not applicable to the snails usually known as *Pupa muscorum*, *blandi*, etc., it becomes necessary to determine what generic name they are entitled to. Mr. B. B. Woodward has placed them in *Jaminia*, Risso, 1826, of which he regards *Pupilla*, Leach, as a synonym. A study of Dr. Dall's paper in NAUTILUS, 1904, p. 114, convinced me that this conclusion was not unassailable, and with the help of additional information very kindly supplied by Dr. Dall, I have decided to my own satisfaction in favor of *Pupilla*. The argument is as follows:

1. *Jaminia*, Risso, 1826, contained species afterwards referred to *Alæa* (1830), *Abida* (1831), *Pupilla* (1831), *Eucore* (1837), and *Sphyradium* (1837). The first species is *minutissima* Hartmann, but this does not agree with the generic diagnosis. The only figured species is an *Abida*, or *Eucore*.

2. *Alæa*, Jeffreys, 1830, contained among other things *edentula*, Draparnaud (now referred to *Sphyradium*) and *minutissima*, Hartmann. The latter is taken as the type by Dr. Dall (t. c., p. 115). Conchologically, *minutissima* has the characters of *Sphyradium*, and not at all those of *Vertigo*, *Pupilla*, etc. Its reference to *Sphyradium*

should be fortified by an examination of the jaw and lingual membrane, but for my own part, I am satisfied that it belongs there. If this is confirmed, *Alæa* takes the place of *Sphyradium*, Agassiz, 1837.

3. *Abida*, Leach in Turton, 1831, has for its sole example and therefore type *Pupa secale*. *Eucore*, Agassiz in Charpentier, 1837, was proposed for *P. tridens* and *P. quadridens*. I do not think these can be regarded as different genera, but the characteristic European group of "*Pupa*" *secale*, *P. tridens*, *P. quadridens*, etc., surely deserves to rank as a valid genus, separate from the circumpolar group commonly known as *Pupa*, subg. *Pupilla*.

4. If *Alæa* = *Sphyradium*, and *Eucore* = *Abida*, all the species of *Jaminia* were provided for by 1831. If *Sphyradium* is distinct from *Alæa*, apparently the diagnosis of *Jaminia* prevents us from using that name for *Sphyradium*.

5. *Jaminia* is therefore either *Abida* or *Pupilla*, both published in the same work. *Abida* has in its favor the figured example; *Pupilla* has Mr. B. B. Woodward's decision. Apparently priority of place should decide the matter.

6. Dr. Dall informs me that in Turton *Pupilla umbilicata* is on p. 98, *P. marginata* (our *muscorum*) on p. 99; *Abida secale* on p. 101 as a synonym of *Vertigo secale* (Draparnand) Turton. Hence *Pupilla* was first removed, and *Jaminia* stands as the proper name for *Abida*, with *Eucore* as a section.

7. I do not think the status of *Pupilla* is affected if we regard *umbilicata* as its type, for I cannot imagine any one could place *umbilicata* and *muscorum* in different genera:

8. Our forms of *Pupilla* stand thus:

Pupilla muscorum (Linné).

b. *unidentata* (C. Pfr.).

c. *bigranata* (Rossm.).

Pupilla hebes (Ancey).

Pupilla blandi Morse.

b. *sublubrica* (Ancey).

c. *obtusa* (Ckll.).

d. *alba* (Ckll.).

Pupilla sonorana (Sterki).

b. *tenella* (Sterki).

Pupilla syngenes (Pilsbry).

b. *dextroversa* (Pils. & Van.).

Pupilla sterkioma (Pilsbry).

NOTES ON THE NOMENCLATURE OF PUPILLIDÆ.

BY H. A. PILSBRY.

The receipt of an article from Professor Cockerell upon this subject, published in this number, causes me to insert here some notes which had been prepared for a forthcoming paper upon the snails of Arizona and New Mexico. The status of the name *Pupa* was discussed by Mr. B. B. Woodward (Journ. of Conch., Oct., 1903, 358), who did good work towards clearing the ground. Dall in this journal for February, '04, also went over the nomenclature correcting some errors, but complicating the question by a few new ones. His statement that "Risso's first species [of *Jaminia*] is *Vertigo minutissima* Hartmann, which should properly have been placed in *Suraphia*," is not borne out by an examination of Risso's work, wherein the species stand thus:

<i>Risso's species.</i>	<i>Equivalents in ordinary use.</i>	<i>Modern genus.</i>
<i>Jaminia muscorum</i>	<i>Pupa muscorum</i> L.	<i>Pupilla</i> .
<i>J. marginata</i>	<i>Pupa umbilicata</i> Drap.	<i>Jaminia</i> .
<i>J. edentula</i>	<i>Bulimus obscurus</i> Müll.	<i>Ena</i> .
<i>J. secale</i>	<i>Pupa secale</i> Drap.	<i>Abida</i> .
<i>J. tridens</i>	<i>Bulimus tridens</i> Brug.	<i>Eucore</i> .
<i>J. granum</i>	<i>Pupa granum</i> Drap.	<i>Abida</i> .
<i>J. sulculata</i>	Undetermined	<i>Abida</i> .
<i>J. trilamellata</i>	Undetermined	<i>Abida</i> .
<i>J. heterostropha</i>	<i>Bul. quadridens</i> Müll.	<i>Eucore</i> .
<i>J. quinquelamellata</i>	<i>Pupa cinerea</i>	<i>Abida</i> .
<i>J. septemdentata</i>	<i>Pupa avenacea</i> Brug.	<i>Abida</i> .
<i>J. heptodonta</i>	Undetermined	<i>Abida</i> ?
<i>J. multidentata</i>	<i>Pupa polyodon</i> Drap.	<i>Abida</i> .
<i>J. niso</i>	<i>Bulimus niso</i> Pfr.	<i>Eucore</i> .

All of Risso's species of *Jaminia* that are recognizable belong to the subsequent groups *Ena* 1831, *Pupilla* 1831, *Abida* 1831, *Eucore* 1837, and *Louria* 1840.

Now *P. muscorum* under the name *marginata* was second of the two species for which the name *Pupilla* was proposed in 1831 in Turton's *Manual*, the other being *P. umbilicata*. The latter was removed in 1840 to *Lauria*, leaving *P. muscorum* the type of *Pupilla*. There is

nothing especially new about this conclusion, since it was reached by Gray in 1847 (P. Z. S., p. 176), and has been held by Pfeiffer, by Von Martens (Die Hel. 1860, p. 290), and nearly every one else. There have been differences of opinion about the limits of the group *Pupilla*, but never about its type. Among American writers, Morse and Tryon have used *Pupilla* as a generic name.

Abida was next removed from *Jaminia*. This is the group commonly known as *Torquilla*. Then in 1837 *Eucore* was proposed for the species *tridens* and *quadridens* (*heterostropha* Risso). These successive eliminations leave only the group *Lauria* Gray, represented by *J. marginata* Risso (= *Pupa umbilicata* Drap.) to bear the name *Jaminia*.*

From the foregoing it follows that the name *Pupilla* will replace *Pupa*, as Prof. Cockerell has held. The groups represented in *Jaminia* Risso, will stand thus :

PUPILLA Lch. in Turton, for *Pupa* of authors.

JAMINIA Risso, restricted, for *Lauria* Gray.

ENA Leach in Turton, for *Buliminus* Auct.

ABIDA Leach in Turton, for *Torquilla* Auct.

EUCORE Ag. in Charp., for *Chondrula* Auct.

All of these groups I regard as of generic rank.

As to *Saraphia* Risso, the only species of the group that has been positively identified is *S. tridentata*, which is the *Carychium tridentatum* of recent authors.

After a bout with Risso, one is likely to accept as a just one Bourguignat's estimate of his abilities : " Écrivain fécond, mais sans jugement, innovateur infatigable, mais absurde, Risso a embrassé dans ses écrits presque toutes les branches de l'histoire naturelle, sans en avoir bien traité une seule."

The group *Alæa* Jeffreys, 1830, has been discussed by Professors Dall and Cockerell, who agree that its type must be *Pupa minutissima* Hartm. It does not do to fix types for these old groups without reference to what has been done by our predecessors. Gray and Herrmannsen took a hand in this game over fifty years ago, and they expressly selected *Alæa polustris* = *Vertigo antivertigo* as the

* The progress of events had already restricted *Jaminia* before Gray chose *J. heterostropha* for its type (P. Z. S., 1847, p. 176). His selection came too late and is ineffective.

type of *Alæa*. I do not see how their action can be successfully opposed. The name *Alæa* has quite generally been used for dextral forms of *Vertigo*, and is so retained in Westerlund's last *Catalog*. No valid grounds exist for shifting the name; and the advisability of substituting *Alæa* for *Sphyradium*, as Prof. Cockerell suggests, need not be considered. His suggestion that *P. minutissima* may be a *Sphyradium* is interesting, and deserves investigation.

Ptychochilus Boettger, is preoccupied by Agassiz in *Pisces*; a fact I neglected to mention at the time I proposed *Nesopupa*. The names stand thus:

Ptychocheilus Agassiz, Amer. Journ. Sci. and Arts, XIX, 1855, p. 227.

Ptychochilus Jordan, Bull. U. S. Nat. Mus. no. 10, p. 58 (1877).

Ptychochilus Boettger, Conch. Mittheil., 1881.

Bifidaria and *Eubifidaria* of Sterki call for some notice in view of the note by Dall in NAUTILUS, Feb., 1904, p. 116. The original species referred by Sterki to *Bifidaria* were *Pupa contracta* Say and *P. servilis* Gld. from certain Mexican localities. For *P. contracta* Sterki subsequently (1892) proposed the section *Albinula*, leaving *servilis* the type of *Bifidaria*.

In January, 1893, Dr. Sterki proposed *Eubifidaria* with the type "*hordeacea* Gabb," by which he meant the form which I call *Bifidaria procera cristata*. This is demonstrated by his previous article treating of "*hordeacea*," by his list of the preceding year, and by the words of his diagnosis of *Eubifidaria*, "lamellæ typical."

The type of *Eubifidaria* is therefore *P. hordeacea* Sterki not Gabb = *B. procera cristata* P. & V., and the group becomes an absolute synonym of *Bifidaria*, s. str. The true *hordeacea* Gabb, which Dr. Sterki demonstrably did not intend, belongs to a different genus, *Pupoides*.

In conclusion I might say that the generic and subgeneric nomenclature of the United States forms, given in my catalogue of 1900,* stands as there set forth with the single exception of the genus *Pupa*, which now becomes *Pupilla*.

The family name having precedence for the group is *Pupillidæ* Turton, 1831.

* Proc. Acad. Nat. Sci. Phila., 1900, pp. 605-610.

NEW SPECIES OF PISIDIUM.

BY V. STERKI.

PISIDIUM LIMATULUM, n. sp.

Mussel small, inequipartite, somewhat oblique, well inflated, superior margin slightly curved, angle at the scutum projecting and rather sharp, at the scutellum rounded; supero-anterior slope distinct, almost straight, anterior end a rounded angle situated low; inferior margin rather well curved, posterior truncate; beak somewhat posterior, moderately large and projecting over the hinge margin, rounded or slightly flattened on top; surface dull to somewhat shining with subregular, crowded, sharp striae very fine over the beaks, becoming coarser towards the margins; color pale horn in the adult, straw to whitish in younger specimens; shell rather thin; hinge comparatively stout, plate rather narrow; cardinal teeth; the right slightly curved, its posterior end much thicker and grooved, the left anterior slightly curved, the posterior oblique, long, more projecting than the anterior; lateral teeth rather large, cusps pointed, strongly rugose, and so are the grooves, the outer posterior in the right valve comparatively long; ligament moderately thick.

Size: long. 3, alt. 2.5, diam. 2 mill.

Habitat: Alabama: Calera, in the current of a creek, and pools left on same; Town Creek at Montevallo; spring creek at Ebenezer Church, a spring branch in Big Wills Valley, six miles south of Valley Head, all collected by Mr. Smith in 1904, and sent for examination by Mr. Bryant Walker.

Pis. limatulum is related to *P. punctatum* Sterki, but considerably larger, and like that minute *Pisidium*, ranges under the *Rivulina* group. With a little care, it cannot be mistaken for any other species; even half-grown examples are considerably different from *P. punctatum*.

PUBLICATIONS RECEIVED:

LIST OF SHELL-BEARING MOLLUSCA OF FRENCHMAN'S BAY, MAINE. By Dwight Blaney (Proc. Boston Soc. Nat. Hist., Vol. 32, no. 2, pp. 23-41). This valuable list of 127 species and 5 varieties collected during the summers of 1901-1904, shows what can be done by careful and continuous work, and adds much to our knowledge of the distribution of New England marine shells. C. W. J.

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No. 10.

SENSITIVENESS OF CERTAIN SNAILS TO WEATHER CONDITIONS.

BY J. B. HENDERSON, JR.

While collecting last summer about Cazenovia, N. Y., my attention was constantly drawn to the extreme sensitiveness to atmospheric conditions of several species of land snails. I was surprised to find that upon some clear days collecting was excellent while upon rainy days scarcely a living specimen could be found. Puzzled by this failure of my expectations, I selected for special observation a certain wooded hillside where the prevailing larger types were *Polygyra albolabris*, *thyroides*, *dentifera*, *Gastrodonta intertexta*, *Omphalina inornata* and *fuliginosa*. I visited the locality from day to day keeping careful note of weather conditions.

I found that the periods of greatest activity among these snails were invariably marked by a falling barometer, but these periods began considerably before there were any noticeable meteorological symptoms presaging rain. At the commencement of actual rainfall, the larger Zonitids only remained especially active. Towards the close of a rain period (generally lasting from twelve to twenty-four hours) though before definite signs of clearing were apparent, all the snails disappeared, sometimes almost completely. The bright clear days succeeding a rain epoch were always poor collecting days, even though the woods were left damp and wet from the drenching that only a Cazenovia rain can give. It would appear therefore, that the moisture in the air rather than that upon the ground influenced

the snails. Their extreme sensitiveness was shown by their anticipation of a weather change from dry to wet, eight to twelve hours before visible signs were given, but what seemed more remarkable was the general withdrawal to shelter of all the snails during a rain period two to three hours before a final clearing of the atmosphere.

A village neighbor kept alive all summer a fine large *P. albolabris* in a small window garden. "Alby's" mistress declared that he was a most reliable barometer and that she could safely accept his weather predictions. The mornings he selected for a stroll beyond the limits of his garden were sure, she alleged, to be followed by thunderstorms in the afternoon.

I also observed that upon certain fair days the board sidewalks were covered with *Cochlicopa lubrica*, hundreds being crushed by pedestrians. I was finally able to verify my theory that these tiny mollusks left their damp retreats beneath the boards from six to eight hours before rain. Indeed, I used the sign frequently to my advantage to regulate my collecting rambles farther afield.

I was unable to discover that the small and minute species living habitually under bark and among debris was affected by weather changes, though I have little doubt that closer observation would show them to be considerably influenced by the amount of moisture in the air. The one very noticeable exception to this was in the case of *Strobilops*. I learned to look for them only in the driving rain, when they all left their usual stations beneath the bark of fallen trees to crawl about in the open.

NOTE ON LUCINA (MILTHA) CHILDRENI GRAY AND ON A NEW SPECIES
FROM THE GULF OF CALIFORNIA.

BY WILLIAM HEALEY DALL.

In my synopsis of the Lucinacea (1901, p. 812) on the authority of Dr. Carpenter (Suppl. Rep. Brit. Assoc. for 1863, pp. 552, 620), I stated that the *Phacoides (Miltha) childreni* Gray, was a native of the Gulf of California and that the original ascription of it to Brazil was an error. I am indebted to Dr. H. von Ihering of the Museu Paulista, Sao Paulo, Brazil, for the means of correcting this statement, which proves to be mistaken.

The shell was first described as *Lucina childrenæ* by Gray in the *Annals of Philosophy*, for 1825, p. 136. Nearly at the same time he referred to its unequal valves in the *Zoölogical Journal*, 1, p. 221. In the autumn of the same year Sowerby figured the interior of a right valve in part xxvii of his "Genera" under the name of *Lucina childreni*. Only in 1828, in the supplement to Wood's *Index Testaceologicus*, was the shell called *Tellina childreni* and figured on supplementary plate 1, figure 1.

The shell was recently collected at Pernambuco by Senor Alfredo de Carvalho and sent to Dr. Von Ihering, who forwarded a specimen to the National Museum, thus confirming Gray's original locality. On comparison with specimens from Cape St. Lucas, named by Carpenter, it became evident that we had to do with two very similar but distinct species. The rarity of the shell is doubtless responsible for the delay in discovering the mistake.

The Brazilian species will of course keep the name given by Gray. To the Cape St. Lucas form we may give the name of *Phacoides (Miltha) xantusi* in honor of its discoverer.

The differences are only apparent on a close scrutiny. The *P. xantusi* seems to be a smaller species when adult, more rounded, more equivalved and with a shorter ligament. It has a more or less bifurcate and vermiculate radial sculpture, that of *P. childreni* being finer, more regular and more distinctly divided into fine continuous radial grooves and a microscopic minor sculpture between them.

As in many other Lucinacea, directly under the beaks there is a small impressed area. In *P. xantusi* this in the right valve projects so as to fill an excavation in the other valve and is so much impressed as to make the beak appear sharper and more produced and to distinctly arcuate the two cardinal teeth. In *P. childreni* the area is smaller, less impressed, not markedly extended toward the other valve and the teeth remain straight. Outside this area a narrow lunule, concentrically striated and bounded by an incised line, rises almost vertically with a length of 19 mm. and a height of about 2 mm. In the Californian species the lunule is very small and bent vertically downward so that in the closed valves it is excavated and not projecting and has a length of about 6 mm. It is almost wholly confined to the right valve. If my specimens fairly represent the species, the posterior area in the Brazilian shell is proportionately

shorter than in the Californian and the basal margin much more produced.

It may be noted that all the figures, including that of Reeve in the *Iconica* (*Lucina* pl. iii, fig. 12, 1850), represent the Brazilian species. The group is represented by nine species in the Tertiary of the Southern United States and Lower California, from the Claibornian up to the Pliocene. It is interesting to find that the Florida Pliocene, *P. caloosana* Dall, though smaller, has the upraised lunule like that of Brazil; while the Pliocene, *P. joannis* Dall, of San Juan, Lower California (opposite Guaymas), resembles the recent *P. xantusi* in having the folded lunule, only, in this case, the margin is more deeply infolded and the shell heavier, more elongate-oval, and about one-fourth smaller. It measures 55 mm. in height by 51 mm. in width; *P. xantusi*, 71 x 65 mm., and *P. childreni*, 86 x 77 mm.

FURTHER NOTES ON THE SPECIES OF *MARTESIA* OF THE EASTERN COAST OF THE UNITED STATES.

BY CHARLES W. JOHNSON.

Since the publication of my article on the species of *Martesia* of the Eastern United States, I find I have overlooked two important facts, involving one, and possibly two species. The first is *Martesia* (*Martesiella*) *fragilis* Verrill and Bush (Proc. U. S. Nat. Mus., xx, p. 777, pl. 79, f. 10, 1898). For this species the above new subgenus is proposed, "which differs from *Martesia* in having a well-defined, elongated, median, dorsal plate, posterior to the umbos, in addition to the shield-shaped one over them." This seems to be a typical *Martesia* for the "elongated median, dorsal plate" (metaplast) is present in all the species. The description of the shell, "umbonal plate" (protoplast), and the figure would indicate that it is very close to or identical with a small specimen of *M. striata* Linn. The "specimens were found in a piece of wood floating near Station 2565, N. lat. 37° 23', W. long. 68° 8'," about 500 miles off the coast of North Carolina.

The second and more important omission was kindly pointed out by Dr. Dall, who in a recent letter says: "I read your paper in the last *NAUTILUS* with much interest, but I cannot agree with you in regard to the *Pholas semicostata* of Lea, for which I proposed the

genus *Scyphomya* some years ago. It is entirely distinct from *Martesia* and nearer *Zirfaea* in some of its characters, but very distinct from either. I have Carolinian specimens, but the shell appears to be rare."

The genus *Scyphomya* was proposed in the Trans. Wagner Free Inst. Science, vol. iii, pt. iv, p. 822, 1898, and while I consulted this work I overlooked it from the fact that Dr. Dall places this genus in the sub-family *Teredininae*, and I only went over that portion pertaining to the genus *Martesia*. From the original description, and the figure alone one would feel doubtful in defining the species. I therefore followed Tryon and left it in the synonymy under *M. striata*.

NOTES ON SOME PREOCCUPIED NAMES OF MOLLUSKS.

BY W. H. DALL.

Prof. Cockerell has kindly called my attention to the fact that the name *Parmulina* proposed by me Oct. 1, 1902, for a section of *Circe*, had been used in the same year for a Rhizopod by Penard. Investigation showing that the latter author had several months' precedence in publication, the name *Parmulophora* is proposed for the mollusk.

In the same work in which *Parmulina* was proposed, I note the overworked name of *Quadrula* used for a Rhizopod. Ratinesque precedes all others in the use of this name, which he applied to a naiad, but it has been used for a Rhizopod, an insect and a crustacean.

I noticed while looking up the data in the case of *Parmulina*, that the name *Patinella*, applied in 1870 by me to *Patella magellanica* and its allies, had been previously used by Gray, in 1848, for a polyp. In place of it for the limpet, I suggest *Patinigera*.

A NEW OREOHELIX.

BY T. D. A. COCKERELL.

Oreohelix strigosa metcalfei, n. subsp.

Shell with max. diam. 20 to 21 mm., alt. about 11 mm.; periphery with a strong but rather obtuse keel, just below which is a single brown band; umbilicus broad, not contracting rapidly within; the

greyish-olivaceous cuticle is confined to the apical whorls in the adult: the "costulation" of the apical whorls is evident, and the oblique striation of the last whorl above is very coarse and prominent.

Mountains near Kingston, New Mexico (O. B. Metcalfe). One living adult and many dead shells, adult and young. Accompanied by *Ashmunella*, *Holospira*, *Vitrea*, *Helicodiscus*, *Vallonia* and *Cochlicopa*.

NAMES IN THE PUPILLIDÆ.

BY W. H. DALL.

In the January NAUTILUS (page 105), Dr. Pilsbry discusses this subject, and incidentally states that in my notes upon it in the February number I corrected some errors, but complicated the question "by a few new ones." I beg to submit, with all deference to Dr. Pilsbry, that it is not I who have introduced the new errors.

A more careful examination of Risso, Draparnaud and Pfeiffer, would have shown him that *Jamnia muscorum* (Drap. not L.) Risso is, as I stated, following Pfeiffer and other European authorities, *Pupa minutissima* Hartmann, and not *muscorum* Linné.

It would be presumptuous in me to attempt for myself a synonymy of the ancient species of common European land shells, which have been worked over with the utmost care for a century by a long line of distinguished students. I did not attempt it, but relied on such respectable authorities as Gray, Draparnaud, and especially Pfeiffer, than whom no one was more careful, erudite, and familiar with the subject. In working out the details of the nomenclature of *Pupillidæ* (a work still in MS.), involving a great amount of labor, I have, as a rule, adopted Pfeiffer's conclusions as to specific identity as entitled to greater weight than any others.

The result of a careful historical search through the whole applicable literature differs in important particulars from Dr. Pilsbry's table in the January number. It is, of course, true, that Pfeiffer, like other people, is not infallible, nevertheless conclusions based on his identifications deserve a certain amount of respect, and should not be stigmatized as *new* errors, even if some doubt continue to exist in occasional instances.

Risso identified his species by Draparnaud's posthumous monograph and its figures, occasionally citing Ferussac and Playfair, and,

under *Jaminea*, only once any older author. Hence the identifications of Draparnaud's names and figures, which seem to be sufficiently certain, settle definitely the place of Risso's names. This results in the following table for *Jamina* :

Risso's names.	Pfeiffer's identifications.
<i>J. muscorum</i> Drap.	<i>minutissima</i> Hartmann.
<i>marginata</i> Drap.	<i>muscorum</i> Linné.
<i>edentula</i> Drap.	<i>edentula</i> Drap.
<i>secale</i> Drap.	<i>secale</i> Drap.
<i>tridens</i> (L. Gmel.) Drap.	<i>tridens</i> Müller.
<i>granum</i> Drap.	<i>granum</i> Drap.
<i>sulculata</i> Risso.	unidentified.
<i>trilamellata</i> Risso.	"
<i>heterostropha</i> Risso.	<i>quadridens</i> Müller.
<i>quinquelamellata</i> Risso.	<i>quinquedentata</i> Born.
<i>septemdentata</i> Risso.	<i>avenacea</i> Brug.
<i>heptodonta</i> Risso.	unidentified.
<i>multidentata</i> Risso.	<i>polyodon</i> Drap.
<i>niso</i> Risso.	<i>niso</i> Risso (doubtful).

Pfeiffer (Nomenclator, p. 356, No. 108) identifies *J. edentula* Risso positively with *Pupa edentula* of authors, but under *obscurus* also enters the name with a query, probably by some transposition of index slips, since the figure cited by Risso cannot represent *obscurus*, which is elsewhere well figured by Draparnaud. This results in the inclusion of *Sphyradium* and the exclusion of the *Ena* of Dr. Pilsbry's table.

Alæa of Jeffreys was proposed for dextral *Pupillidæ*, but as this distinction is practically valueless, we have to fall back on his list of species and proceed by elimination to get the group which will bear the name permanently.

The table of equivalents for his original list is as follows in their original order :

Jeffreys' names (1830).	Pfeiffer's identifications.
1. <i>Pupa marginata</i> Drap.	= <i>muscorum</i> L. not Drap.
2. " <i>nitida</i> Jeffreys.	= <i>edentulum</i> Drap.
3. " <i>revoluta</i> Jeffreys.	= <i>edentulum</i> var.
4. " <i>cylindrica</i> Jeffreys.	= <i>minutissima</i> Hartmann.
5. " <i>vulgaris</i> Jeffreys.	= <i>pygmæa</i> Drap.
6. " <i>palustris</i> (Leach MS.) Jeffreys.	= <i>antivertigo</i> Drap.

Of these 1 = *Pupilla*, 1831; 2 and 3 = *Sphyradium*, 1837; 5 and 6 = *Vertigo* Müller, 1774; leaving only 4, *minutissima*, which becomes the type. All the eliminations antedate Gray in 1847, who named *palustris* (= *antivertigo*) as type too late. Herrmannsen says that *muscorum* and *antivertigo* are the types, and that Beck restricted it to *antivertigo*. The latter statement is an error, as Beck did not restrict the group at all, or name any type, giving a heterogeneous list much like that of Jeffreys.

The correction of *hordacea* "Gabb" to *hordeacea* "Sterki, not Gabb," may be allowed in view of the data given by Dr. Pilsbry, but, in a general way, when a species, not of the writer's own, is mentioned by an author without further data as type of a new group, it is, I think, essential not to "go behind the returns," as any other way must lead to hopeless confusion.

My notes in the article referred to, were condensed from some hundred pages of synonymic data, and no attempt was made to give more than the barest outline of the cases cited. But in every case good reasons can be adduced for the position taken, though no one is less ready to claim infallibility than the present author.

THE PUPILLIDÆ OF RISSO AND JEFFREYS.

BY HENRY A. PILSBRY.

The first attempt at a difficult and involved problem often falls short of a complete solution, through the omission of some obscure or apparently irrelevant factor bearing upon the matter; but the work done clears the way for another student to approach the task more advantageously. A discussion like the present one upon the Pupæ is not properly to be called a controversy. It is a symposium, to which various students bring their several portions of fact, observation and deduction, to the end that harmonious structure may be built more symmetrical than any formed by a single effort.

My former paper upon *Pupillidæ* (NAUTILUS, January, p. 105), was faulty in two respects: first, in ascribing "new errors" to Dr. Dall, for I propose to show that the errors largely antedate his work, and second, in my failure to give at length my reasons for certain identifications of some of Risso's names. These reasons I will pro-

ceed to give, so far as they relate to species about which there is any difference of opinion.

Dr. Dall's identifications of Risso's list of species of *Jamnia* agree with those given by me except for the following four species:

Risso's name.	Dall's table (p. 115).	Pilsbry's table (p. 105).
(1) <i>J. muscorum</i> .	<i>minutissima</i> Hartm.	<i>P. muscorum</i> L.
(2) <i>J. marginata</i> .	<i>muscorum</i> L.	<i>P. umbilicata</i> Dr.
(3) <i>J. edentula</i> .	<i>edentula</i> Drap.	<i>B. obscurus</i> Müll.
(4) <i>J. quinquelamellata</i> .	<i>quinquedentata</i> Born.	<i>P. cinerea</i> .

My reasons for the names given in the third column follow:

(1) *J. muscorum*. The identity of this shell is at first sight not very clear. Risso refers to Drap., who (very badly), figures *P. minutissima* under the name *muscorum*; but Risso's description does not at all fit *minutissima*, nor does the size given. Bourguignat, who examined the Risso specimens, refers them positively to the *P. muscorum* of L., as understood at the present time, and the description agrees with this species. Risso's specimens would fall in the form "*unidentata*," Risso describing it as with a very small posterior lamella.

The evidence obtained by a careful study of the original work therefore shows that Risso did not have *P. minutissima*.

(2) *J. marginata*. Risso gives three references: "Drap. 61, 6, iii, 36, 38. Feruss. 59, 475. Playf. 59, 9, iii, 23, 24," all of them pertaining to forms of *muscorum* L. "Playf." is not Playfair, as might be supposed, but Risso's curious conception of the name *Pfeiffer*; the work referred to being Carl Pfeiffer's *Systematische Anordnung und Beschreibung deutscher Land und Wasser-Schnecken* (1821). Pfeiffer is elsewhere referred to as "Pleyfel!"

Risso says that the peritreme is provided with a *long acute lamella posteriorly on the right*. This cannot be made to fit any form of *muscorum*, but applies perfectly to *umbilicata* Drap.; and Bourguignat referred Risso's specimens, which he examined, to that species.

(3) *J. edentula*. This is described by Risso as with *eight whorls*, toothless aperture, and *ten mm. long*, so it clearly is not *Sphyradium edentulum*, as Dall supposes. It is obvious that the reference to Draparnaud's *P. edentula* was an error. These and the other characters given by Risso agree with *Buliminus obscurus* (*Ena obscura*),

which occurs at Nice ; and Bourguignat, who examined Risso's collection, has recorded this identification.

(4) The last of the four cases is only a nominal disagreement, the two names referring to one and the same species. I used that of *cinerea* Drap. because grave doubt has been cast upon the identity of Born's *quinquedentata* with the form so named by many later authors, while "*Pupa cinerea*" is a common name for the form in collections.

This disposes of all the cases in question, and so far as I can see, the name *Jaminia* will be retained for Risso's second species *J. marginata* Risso = *Pupa umbilicata* Drap. It will be noted that Dall, in his first article, also selects Risso's second species as type, but as he was misled by a wrong identification of *marginata* Risso, he did not use the name for the same group. *Jaminia* is a genus of the "European system" with no species in America. It has a great superficial resemblance to *Pupilla*, but with some extraordinary characters certainly entitling it to generic rank.

I am not concerned to show whether or not Pfeiffer correctly identified Draparnaud's figures, but I fully share Dr. Dall's confidence in his general accuracy. While there is no doubt that Risso, like everybody else at that time, identified his shells largely by Draparnaud's volume, yet his names do not rest for identification solely upon the references to Draparnaud any more than Binney's species rest upon the references he cites. Primarily, *they rest upon the descriptions given by Risso himself*. To identify Risso's species by the references to Draparnaud's figures presumes absolute accuracy of identification on Risso's part. Therefore, in discrediting the identifications as given by Dr. Dall, I am not questioning Pfeiffer's reliability in the least. I am simply recording a few of the mistaken identifications of Risso, who, it is acknowledged by all who have used his work, was careless to a degree.

Dr. Dall, in using Risso's list, considers it necessary to point out what his species really are in terms of Pfeifferian nomenclature. But it seems to me that the very foundation of the subsequent structure is involved in getting at the actual identity of the species in question. Otherwise conclusions based upon the list are without permanence. The names can either be taken as they stand in Risso, or they can be really corrected. No half-way correction of the list of species goes to the root of the matter. There probably cannot be found a zoologist of experience in the world who will support the

method of identifying Risso's species by means of Pfeiffer's identifications of Draparnaud's figures, as opposed to the method by the study of Risso's own descriptions.

In my opinion, any sound work based upon Risso must begin with a study of his descriptions, specimens in hand. In the case of non-marine forms, the task has been materially lightened by Bourguignat, who examined and reported upon Risso's collection; but even with this, it is safest to check up all points with the shells and descriptions themselves.

In the matter of *Alæa* Jeffreys, a few words may not be amiss. I hold that when an author distinctly indicates a certain group by his diagnosis, the mere inclusion of some heterogeneous species should not be allowed to totally pervert his intention. This is common law, and good law too. Now Jeffreys defines *Alæa* as having short lamellæ in the mouth (making no provision for toothless forms in his diagnosis); and he expressly states that *Alæa* is separated from *Vertigo* because the shell is dextral (the type of *Vertigo* being sinistral).

Now there are still authors who hold that the dextral Vertigines need a subgeneric or sectional name, and from the time of Gray (1847) to the last Catalog of Westerlund (1890) the name *Alæa*, with the type *antivertigo* has been more or less constantly in use. I do not think that Dr. Dall can brush aside these facts by stigmatizing the distinction for which the name has always stood as "practically valueless," and proceed to fasten a totally new significance upon it. Quite a respectable company of conchologists of high rank, including Pfeiffer (in the *Nomenclator Hel. Viv.*), find use for *Alæa* in the sense established by Gray, as set forth in my former note.

I do not wish to be understood to break a lance in support of the value of *Alæa* as a division of *Vertigo*; but a division adopted by Pfeiffer and other high authorities is at least entitled to respectful consideration. It seems inadvisable to use the name of such division for a totally different group, at all events until malacologists recognize a Supreme Authority who shall pronounce once for all upon what distinctions are "practically valueless,"—a consummation remote from this contentious generation.

The facts are, in short, as follows: (1) Jeffreys regarded the toothed forms of his list as typical of his group. Gray in 1847 selected one of these, *P. antivertigo*, as type, that species never be-

fore having been selected as a genotype. (2) This usage has obtained currency by numerous authors, while the name has never been used in any other sense. (3) Dall (1904) ignores this use of the name, and selects a new type which disagrees wholly with the original diagnosis, though included by Jeffreys in the original list of species.

The cases of *Jaminia* and *Alæa* are now respectfully submitted for the judgment of conchological and nomenclatorial experts.

NOTES AND NEWS.

We regret to announce the death of Rev. E. H. Ashmun, which occurred at San Rafael, California, Dec. 21, 1904. We hope to give a further notice next month.

MR. FREDERICK PRICE MARRAT died at Liverpool, England, on November 7, 1904, at the age of 84. "For more than 40 years Mr. Marrat had been connected with the Liverpool Museum, where he worked in conjunction with the late Mr. T. J. Moore and the Rev. H. H. Higgins, a trio of enthusiastic museum workers who contributed so greatly to the building up of the magnificent collection in the Liverpool Museum. Mr. Marrat paid special attention to the geological, mineralogical and conchological collections, his most intimate work being connected with conchology, not only the conchological collection in the Liverpool museum being named by him, but also similar collections in various museums, and also in private houses. He was the principal authority on the genus *Oliva*, of which he acquired a very extensive series, and contributed monographs to Reeve's *Conchologica Iconica* and to Sowerby's *Thesaurus Conchyliorum*, as well as to many periodicals and other publications on the mollusca."—(*Museums Journal*, Dec., 1904.)

PUBLICATIONS RECEIVED.

MOLLUSCA OF SOUTH AFRICA (PELECYPODA). By G. B. Sowerby (From "Marine Investigations in South Africa, Vol. iv). Thirty-three new species are described and figured on two plates.



EDWARD H. ASHMUN.

THE NAUTILUS.

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No. 11

EDWARD H. ASHMUN.

Rev. Edward Houghton Ashmun, was born at Tallmadge, Summit Co., Ohio, March 12, 1853. Most of his boyhood was spent there, his father being a farmer. When seventeen he moved with his father to Weeping Water, Nebraska. As time went on, he became strongly impressed with a desire to enter the ministry, and toward that end went to Tabor College, at Tabor, Iowa, where he graduated in 1879, and entered the Yale Divinity School, finishing in 1882. He was pastor of the Congregational Church at Syracuse, and Beatrice, Nebraska, after which he was called to the Boulevard Church in Denver, Colorado, which became very prosperous under his ministry. In 1892 he was appointed to the position of Home Missionary Superintendent of Arizona and New Mexico, in which position he remained six years, and then Pastor Superintendent of Arizona for two years, residing at Jerome, Arizona.

It was during his residence in the southwest that Mr. Ashmun became interested in studying the land shells of that region, and made many rare and interesting discoveries. Collecting in this arid region is laborious and rarely as remunerative as in the more fertile sections. The molluscan fauna is largely confined to the higher mountains, the only situation where there is sufficient moisture for snail life; species are thus widely separated and insulated by the lower and arid wastes, thus presenting as many interesting problems in distribution as exist in true insular faunæ. Under the above conditions lives a group of snails, with shells like those of *Polygyra*, but anatomically very distinct, and nearer related to *Sonorella*,

which on the other hand is related to *Epiphragmophora*. To this group of shells Messrs. Pilsbry and Cockerell, gave the name of *Ashmunella** in recognition of his valuable field work. Mr. Ashmun also discovered a number of new Pupidæ, etc. as shown by the following list of new species collected by him in that region:—

<i>Bifidaria perversa</i> Sterki.	<i>Ashmunella rhyssa</i> Dall.
<i>Bifidaria quadridentata</i> Sterki.	<i>Ashmunella miorhyssa</i> Dall.
<i>Bifidaria ashmuni</i> Sterki.	<i>Ashmunella ashmuni</i> Dall.
<i>Bifidaria hordeacella parvidens</i> Sterki.	<i>Ashmunella pseudodonta</i> Dall.
<i>Pupilla sonora</i> Sterki.	<i>Ashmunella pseudodonta capitansensis</i> A. & C.
<i>Pupilla sonora tenella</i> Sterki.	<i>Agriolimnæ ashmuni</i> Pils. & Van.
<i>Pyramidula cockerelli</i> Pils.	<i>Sonorella ashmuni</i> Bartsch.

Mr. Ashmun's article on "Collecting in Arizona and New Mexico" (THE NAUTILUS, xiii, p. 13, 1899) is very interesting and gives a good idea of the difficulties which attend collecting in that region. Conjointly with Prof. Cockerell he described a new subspecies of *Ashmunella* (*A. pseudodonta capitansensis*). It was collected on the Capitan Mts., New Mexico, at an elevation of 8,200 feet. (NAUT. xii, p. 131, 1899).

During his last year in Arizona his health began to fail, and he moved to Idaho, hoping that the change would benefit him, but after two years as pastor of the church at Weiser, he had to give up his charge, and after a time was obliged to go to a sanitarium, where he remained ten weeks and was apparently cured of the stomach trouble with which he had been suffering. He was advised to live out of doors as much as possible for two years, and was appointed to investigate the mosquito pest at San Rafael, California. This seemed to furnish the outdoor life he needed, and he improved for a time, but in the fall caught a cold and finally had to give up. He was threatened with paralysis from the first, and it seemed that his nerve exhaustion was complete. He again went to a sanitarium, but nothing could be done. He died December 21, 1904, and was interred at Santa Rosa, California.

He was married in 1890 to Miss Anna L. Lyman, daughter of the Rev. Addison Lyman of Kellogg, Iowa, who with a son, Henry G. Ashmun, a bright boy of twelve, survives him, and to whom we tender our sincere sympathy.

C. W. J.

* The NAUTILUS, XII, p. 107; Proc. Academy Nat. Science for 1899, p. 188, and for 1900, p. 107.

SOME NEW SPECIES OF MOLLUSKS FROM CALIFORNIA.*

BY WILLIAM HEALEY DALL.

In assorting some mixed material from California a number of new species were noted; and, as it has become necessary to refer to some of them by name, the following preliminary diagnoses are given.

Leda ambliia n. sp.

U. S. Fish Commission station 4517, Monterey Bay. Shell chalky under a polished dark olive-green periostracum, compressed, rostrate, concentrically and feebly irregularly striate, with obscure microscopic radial lines; lunule narrow, lanceolate; escutcheon, long, wide smooth and slightly concave, the valve margins rising slightly in the median line; valves bluntly rounded in front, bluntly truncate behind, the rostrate portion not set off from the body by any constriction, and the radial subangular lines which bound the rostral area are feeble and obscure; interior whitish, with a deep subumbonal impression, a very shallow and obscure pallial sinus, very short siphons, 12 or 13 anterior, 18 or 19 posterior normal hinge teeth, with a narrow, backwardly oblique socket for the resilium. Lon. of adult shell 18.0; alt. 9.5; diam. 5.5; vertical of the beaks behind anterior end, 7.0 mm. This has much the general form of *L. leonis*, Dall, but wants the prominent sculpture and is of a different color.

Magilia perattenuata n. sp.

Monterey Bay, 10-45 fms., Woodworth. Shell small, very slender, with one smooth turgid nuclear, and six smooth normal whorls; the whorls are but slightly convex, whitish, the suture very distinct, its posterior margin slightly overhanging or dominant; aperture narrow, short, simple, the outer lip slightly concavely waved between the periphery and the suture, canal short, a little recurved, relatively rather wide. Lon. of shell 9.5; of last whorl 3.75; max. diam. 2.5 mm. A single specimen sent by Mr. Woodworth is broken and dead, but its characters are not shared by any other species from the Coast as far as now known.

Admete woodworthi n. sp.

Monterey Bay, 10-45 fms., Woodworth. Shell small, thin, whitish, with a yellow-brown periostracum, five normal, sculptured, and one

smooth, turgid nuclear whorl, gradually increasing, subtabulate by a prominent spiral thread at the shoulder while young, rounded at the last whorl, with 8 or 9 obscure riblets on the upper part of the spire, which are obsolete on the last whorl and a half; spiral sculpture of rounded threads, with wider flattish, somewhat irregular interspaces; peristome continuous with a slight notch or sulcus near the end of the nearly straight pillar, and with no umbilicus; there are two obscure plaits on the pillar, which is not marked by any umbilical chink or fissure; aperture with the external sculpture modifying the margin, but no lirations. Lon. of shell 9.0; of aperture 4.0; max. diam 4.5 mm.

This is less strongly sculptured, more slender and with a less arcuate pillar than any of the other *Admetes* of the coast, and belongs in the group half way between such *Cancellarias* as *C. modesta* and *Admete gracilior* Carpenter. It has very much the form of *C. circumcarinata* Dall, on a smaller scale and with a more acute spire.

Erato albescens n. sp.

U. S. Fish commission station 4431, California. Shell whitish, thin and polished, with four whorls; the spire low and nearly covered with a thin glaze extending from near the aperture; shell bluntly pyriform with a wide mouth, smooth pillar, the outer lip thickened, obscurely marginate externally, with about nine obscure distant denticulations internally, pillar short, twisted, with a flaring edge and almost gyrate axis; the body with a thin wash of callus, but, in the type no sign of pustulation. Lon. of shell 15.0; of aperture 13.5; max. diam. 10.0 mm.

This succeeds *E. vitellina* Hinds as the largest species of the genus and is a much thinner and lighter shell, beside differing in color.

Scissurella (*Schizotrochus*) *kelseyi* n. sp.

California at U. S. Fish Com. Station 4353, also off San Diego.

Shell large for the genus, trochiform, white, with about four rounded whorls, sculptured with fine (forwardly convex) arcuate threads or raised lines, which above the fasciole are spirally microscopically striate, and on the base, with somewhat regularly spaced and stronger spirals; the fasciole is narrow, slightly above the periphery, bounded by two sharp, very thin, elevated keels; the slit

extends about one-fifth of the circumference of the last whorl. The aperture is nearly circular, interrupted for a short distance by the body, the inner lip slightly reflected over a small umbilicus; the operculum is multispiral and pale yellow. Alt. of shell 6.0; of aperture, 3.0; max. diam., 5.5 mm.

This species is somewhat like *S. umbilicata* Jeffreys from the North Atlantic, but is larger, more strongly sculptured and more elevated proportionately. It is the second species of the family to be described from the Pacific Coast; the other *Schismope rimuloides* Carpenter having been reported from San Diego and Mazatlan. It is named in honor of Prof. F. W. Kelsey, of San Diego, to whose interest in the local mollusks we owe several additions to that fauna.

CRITICAL NOTES ON THE SMALLER LYMNÆAS.

FRANK COLLINS BAKER.

The small forms of *Lymnæa*, which have been included under the names of *humilis* and *desidiosa*, have been little understood by American conchologists, at least two good species being included in *humilis*. A recent somewhat exhaustive study of these small forms has led the writer to conclusions diametrically opposed to those held by Binney and Tryon and most subsequent students of fresh-water mollusks.

In pursuing these studies, the types of Say's and Lea's species in Philadelphia and Washington have been examined, and in addition the collections of the Philadelphia Academy of Natural Sciences, the Smithsonian Institution, Mr. Bryant Walker, Detroit, Michigan, Mr. Henry Hemphill, San Diego, California, Mr. J. H. Ferriss, Joliet, Illinois, and the Chicago Academy of Sciences have been studied. My thanks are due to the above-named gentlemen for the use of their collections, and also to Dr. W. H. Dall, Dr. H. A. Pilsbry, Mr. Paul Bartsch and Mr. E. G. Vanatta, for much valuable assistance and kind criticism.

Lymnæa humilis Say.

Lymnæus humilis Say, Journ. Phil. Acad., II, p. 378, 1822.

Lymnea griffithiana Lea, Proc. Amer. Phil. Soc., II, p. 33, 1841.

Lymnea linsleyi DeKay, N. Y. Moll., p. 72, pl. iv, fig. 74, 1843.

Lymnea lecontii Lea, Proc. Phil. Acad., p. 112, 1864.

In this species American conchologists have confused several seemingly valid species. Say's types (two specimens) preserved in the Philadelphia Academy, came from South Carolina and agree fairly well with Binney's figure 99, in Land and Fresh-Water Shells of North America. The South Carolina specimens are a trifle narrower and less rotund than specimens from the north. *Humilis* is of good size, with regularly rounded whorls, a broadly conical spire, impressed sutures, $5-5\frac{1}{2}$ whorls, aperture elongate-ovate and a trifle less in length than the spire. The last whorl is somewhat inflated, and the umbilical chink very distinct, being more open in some specimens than in others. The surface is marked by lines of growth, and in some specimens from Maine by elevated spiral ridges. The fine impressed sculpture of some *Lymnæas* (as *columella*) is absent in this species, as well as in the others mentioned below. Typical measurements are as follows :

Length 9.00 ; width 4.75 ; aperture length 4.50 ; width 2.75 mill. (Say's type.)

Length 8.50 ; width 4.00 ; aperture length 4.50 ; width 2.75 mill. (Chicago.)

Length 7.50 ; width 4.25 ; aperture length 3.50 ; width 2.50 mill. (Maine.)

Small forms of *Lymnæa cubensis* Pfeiffer, resemble *humilis* ; *cubensis* has a wider, more solid shell, a more open umbilicus, and the expansion of the columella is broader and of a different form, as is also the aperture.

L. humilis is found from Maine to California, and from Canada to Mexico.

Lymnæa parva Lea.

Lymnea parva Lea, Proc. Amer. Phil. Soc., II, p. 33, 1841.

Lymnea curta Lea, Proc. Amer. Phil. Soc., II, p. 33, 1841.

This is a very small species, in fact the smallest of the *Lymnæas*. It differs from *humilis* in its diminutive size, and in the very different form of the shell, which is solid, translucent, turreted ; color light brown or yellowish-white ; whorls $4\frac{1}{2}-5$; these are more convex than in *humilis*, caused by the more deeply impressed sutures ; the spire forms an acute pyramid in some specimens, and a broad

pyramid in others, and is considerably longer than the aperture ; the aperture is roundly elliptical and almost continuous, differing markedly in this respect from *humilis* ; the inner lip is more erect in the present species, which causes the umbilicus to be round, deep and open. The umbilical region is gracefully rounded. Typical examples measure as follows :

Length 6.00; width 3.00; aperture length 3.00; width 1.75 mill. (Indiana.)

Length 6.00; width 3.00; aperture length 2.50; width 1.25 mill. (Penn.)

Length 5.50; width 3.00; aperture length 2.75; width 1.50 mill. (Ills.)

This species is widely distributed, being found from Maine to California and from Canada to Mexico.

Lymnæa desidiosa Say var. *modicella* Say.

Lymæus modicellus Say, Jour. Phil. Acad., V, p. 122, 1825.

Say described this species from two specimens which are still preserved in the Philadelphia Academy. It would seem to be distinct enough to be recognized at least as a variety of *desidiosa*, to which it is more closely allied than to *humilis*. The principle characteristics are the short, dome-shaped spire, the regular elongate-ovate aperture and the large size of the last whorl as compared with the spire. The umbilical chink is narrowly open and there is a small plait on the columella. Typical specimens measure as follows:

Length 8.50; width 4.75; aperture length 4.75; width 2.75 mill. (Say's type.)

Length 7.75; width 3.25; aperture length 4.50; width 2.25 mill. (Berry Lake.)

Length 7.00; width 3.50; aperture length 4.50; width 2.00 mill. (Berry Lake.)

The range of this form, as far as known, is from Ontario to Oregon and south to Texas. It has been found in Big Payette Lake, Idaho, at an altitude of 5,000 feet above the sea level.

The forms described by Dr. Lea as *L. plica*, *planulata*, *exigua* and *rustica* seem to be absolute synonyms of *desidiosa*, some of these being, in all probability, immature forms. The types of *exigua* and *rustica* are not in existence, so far as known. They are not in the Philadelphia Academy nor in the Smithsonian Institution.

A NEW SPECIES OF PISIDIUM.

BY V. STERKI.

Pis. atlanticum, n. sp.

Mussel of medium size, somewhat inequipartite, oblique, short, angular, rather well inflated; superior margin, moderately to rather strongly curved, with the angles at the scutum and scutellum projecting and more or less rounded; supero-anterior slope well marked, steep, slightly curved to almost straight, anterior end a rounded angle situated low; posterior part high, posterior margin (squarely) truncate to subtruncate to rounded, inferior well curved; beaks somewhat nearer the posterior end, rounded, prominent over the hinge margin, rather variable; surface dull to somewhat shining, with striae very fine and crowded over the beaks and somewhat coarser towards the margins; color straw or whitish to pale horn to grayish or brownish; shell opaque to more or less translucent, rather thin, nacre glassy to whitish; inner surface densely rugulose within the pallial line, muscle insertions distinct; hinge rather slight, curved, plate narrow; cardinal teeth: the right curved to angular, its posterior part thicker and grooved, the left anterior short, angular, the posterior oblique, short, slightly curved, thin, less projecting than the anterior; lateral teeth rather slight, the inner cusps of the right valve not pointed, the outer quite small, those of the left valve pointed, not very abrupt; ligament slight.

Size: long. 4.3, alt. 3.8, diam. 2.6 mill.

Size: long. 4.5, alt. 3.9, diam. 3.1 mill.

Habitat: New York to Florida and Mexico: Cedarville, N. Y., sent by Mr. Walter Webb (No. 4853*), Lynchburg, Va., sent by Mr. J. B. Henderson, from Sanderson Smith (No. 654), Lake Jessup, Fla., sent by Mr. Bryant Walker (No. 3002); pools near Wetumpka, Ala., sent by the same, collected by Mr. Smith in 1904 (No. 4963), De Kalb, Bowie Co., Tex., collected and sent by Mr. Jas. H. Ferriss (No. 466), Texolo, Vera Cruz, Mexico, sent by Dr. H. A. Pilsbry (No. 4746). From most places there were good numbers of specimens, young to full-grown. Although evidently all of one species, the specimens show considerable variation in regard

* Of my collection of Cycladidae.

to size, shape, relative size and prominence of the beaks, striæ and appearance of the surface, color, translucency or opacity of the shell. Some of the full-grown examples are straw-colored all over, others horn or grayish with a broad or narrow light zone along the margins. None of the different forms can be regarded and described as typical and the others as varietal since they are connected by intergradations. In younger specimens, the superior margin is generally less curved, the anterior and posterior more so than in the adult. The rugosity of the inner surface of the shell is like that of *Pis. noveboracense*, although microscopical, much coarser than e. g. in *P. variabile* Pr. and *compressum* Pr.

Pis. atlanticum seems nearest related to *P. noveboracense*, but the mussel is shorter, its posterior part comparatively higher, the supero-anterior slope is steeper and the color is different.

SOME NOTES ON BERMUDIAN MOLLUSKS.

BY OWEN BRYANT.

Dr. Pilsbry, in his article on "The Air-breathing Mollusks of the Bermudas" in Transactions of the Connecticut Academy (Vol. X, part 2, p. 493, Sept., 1900) says: "From the data supplied by Prof. Verrill's expedition and that of Prof. Heilprin, it seems that *Vallonia pulchella*, *Cecilioides acicula*, *Agriolimax lævis* and *Physa acuta* rest upon single records now nearly twenty years old, and they may not have permanently colonized; but as none of them are conspicuous forms, and no special collectors of land shells have sought for them, the merely negative evidence is inconclusive."

In this connection it is interesting to note that *Physa acuta* Drap., was found by Mr. Davis and recorded in the NAUTILUS (Vol. XVII, p. 125, Mar., 1904). *Cecilioides acicula* Müll. and *Vallonia pulchella* Müll. were found by Mr. Addison Gulick and myself on the grounds of the Hotel Frascati, while studying at the Bermuda Biological Station in July and August, 1903. A careful search would very likely reveal *Agriolimax lævis* Müll.

Vallonia pulchella (Müll.).

First recorded by Jones, 1876. (The Visitor's Guide to Ber-

muda, by J. M. Jones. Halifax, 1876, p. 138). It occurs also in the lists of Bland, 1881 (In Wallace's Island Life, p. 256) and of Heilprin, 1889 (The Bermuda Islands, p. 182).

I found it scarce under loose stones on the grass near the Frascati.

Cecilioides acicula Müll.

First recorded by Bland in 1861 (Annals of the Lyceum of Natural History of N. Y., VII, p. 351). Also recorded by Jones in 1876.

I first found a dead shell of this species in looking over some red earth at the laboratory. Later I discovered thirty-five or more on the ground under an overhanging stone about 100 feet from the first locality. Most of these were either alive or recently dead. The soft parts were drawn up above the body whorl. It probably lives in the grass.

For the identification of this species I am indebted to Mr. Paul Bartsch who kindly compared specimens with those in the National Museum.

Zonitoides arboreus (Say).

This species is apparently unrecorded; a considerable number were on the under side and in the crevices of a large rotten log in a bamboo thicket near the Frascati. They are somewhat lighter and yellower than New England specimens.

Vitrea lucida (Drap.)

The first mention of this species is made by Prof. A. E. Verrill (Trans. Conn. Acad. Vol. xi, pt. 2, p. 733, fig. 81), who says: The fresh shells of this species were found in large numbers by Mr. A. H. Verrill in March 1901, in a garden at Hamilton but none were living. The last whorl of many of the shells was distorted and rough, as if the conditions had been unfavorable for some time before death. Perhaps the weather was too dry. It is doubtful therefore whether it has succeeded in establishing itself permanently in the islands. It is a native of southern Europe."

I found this species very abundant in the Botanical Garden, at Hamilton. They were on the ground and under leaves in flower beds, and beside a wall where shrubs and vines were growing. Many were alive though a large proportion showed the distortion which Professor Verrill speaks of and which is well shown in the figure he gives.

Vitrea lucida seems now to have become a part of the fauna of the Bermudas.

In closing I take pleasure in acknowledging my indebtedness to Mr. A. Gulick for his kind assistance in the determination of the species named above, and to Dr. Pilsbry for the final determination of *Vitrea lucida* and *Zonitoides arboreus*.

NOTES.

PENNSYLVANIAN SNAILS AND THE STATE ZOOLOGIST.—In the last Monthly Bulletin of the Division of Zoology of the Pennsylvania State Department of Agriculture (Vol. II, no. 8), Prof. H. A. Surface, the State Economic Zoölogist, remarks (p. 245): "Since very little has been written concerning the molluscan life in Pennsylvania, we may at some future time prepare a Bulletin upon this particular subject," etc., etc. As most of the common non-marine mollusks of the Eastern States were described by Thomas Say from Pennsylvanian examples, and there have been articles bearing on our mollusks published at pretty short intervals for almost a century, we had somehow gotten the idea that a good deal had been "written concerning molluscan life in Pennsylvania." To be told that all that conchologists have done upon Pennsylvanian mollusks in a hundred years looks "very little" in the official eye of the State Zoologist, is discouraging. He must be looking for something the size of the Encyclopedia Britannica. We are on the watch for that promised Bulletin.

Californian Nudibranchs.—The publication of Dr. MacFarland's preliminary account of the Dorididae (sens. latiss.) of Monterey Bay (Proc. Biol. Soc., Wash., Feb., 1905), is an event of no little importance to malacology. Out of twenty species, fifteen are new, three belonging to new genera. Two of the new genotypes I had in hand in 1901, and prepared descriptions; but I learned by correspondence with Dr. MacFarland that he had them earlier, and had studied their anatomy. I can, however, cite localities extending their range far southward. *Hopkinsia rosacea*, MacF., was collected by Miss V. Thomas at La Jolla, Aug. 3, 1901. The specimen was apparently immature, being only about 12 mm. long, with only 5 branchial plumes. Its color was a brilliant crimson, the dorsal pro-

cesses somewhat paler, and tipped with white. *Laila cockerelli*, MacF., was taken by my wife as far south as La Jolla, while Mrs. Oldroyd showed me one dredged at San Diego by Prof. Kofoid.—
T. D. A. COCKERELL.

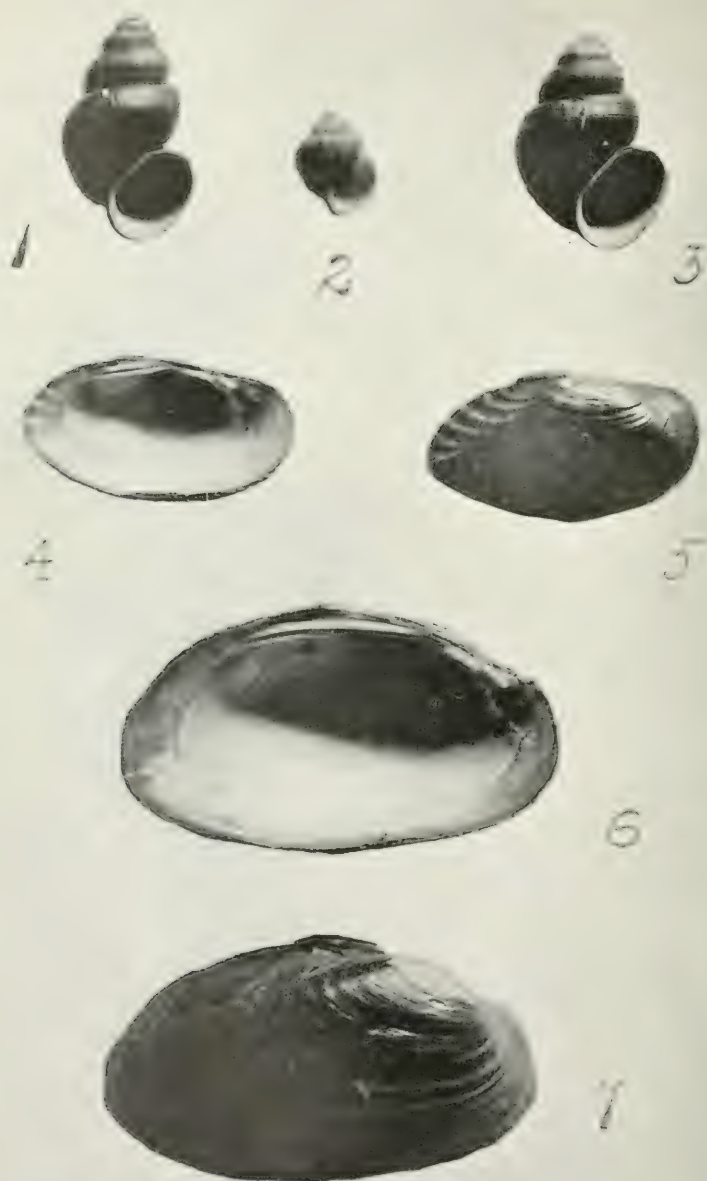
PUBLICATIONS RECEIVED.

A PRELIMINARY ACCOUNT OF THE DORIDIDÆ OF MONTEREY BAY, CALIFORNIA. By F. M. MACFARLAND. (Proc. Biol. Soc. of Washington, XVIII, pp. 35–54, Feb. 2, 1905.)

It is with pleasure that we announce the publication of this paper. The nudibranchs have been sadly neglected on the Pacific coast, and we shall look forward with much interest to the series of systematic and morphological papers soon to appear. The present paper contains the descriptions of 20 species, including three new genera (*Montereina*, *Laila* and *Hopkinsia*) and the following new species: *Montereina nobilis*, *Discodoris heathi*, *Rostanga pulchra*, *Cadlina marginata*, *C. flavomaculata*, *Doriopsis fulva*, *Aegires albopunctatus*, *Laila cockerelli*, *Triopha maculata*, *T. grandis*, *Polycera atra*, *Acanthodoris hudsoni*, *A. brunnea*, *Ancula pacifica*, *Hopkinsia rosacea*.—C. W. J.

DESCRIPTION OF TWELVE NEW SPECIES AND ONE VARIETY OF MARINE GASTROPODA FROM THE PERSIAN GULF, GULF OF OMAN AND ARABIAN SEA. By JAMES COSMO MELVILL. (Jour. Malacology, XI, pp. 79–86, pl. vii, 1904.)

MARYLAND GEOLOGICAL SURVEY, MIOCENE.—This magnificent work on the Miocene of Maryland, consists of a volume of text of 543 pages (pp. 130 to 401 being devoted to mollusca), and another volume of 126 plates, 69 of which contain illustrations of mollusca. The introductory chapters are by Drs. Wm. B. Clark, Geo. B. Shattuck and Wm. H. Dall; while the systematic portion represents the work of several specialists. The Cephalopoda, Gastropoda, Amphineura and Scaphopoda are described by Dr. G. C. Martin, the total number of forms described being about 220, of which 68 represents new species or varieties. A new subgenus of *Cancellaria* (*Cancellariella*) is proposed. The Pelecypoda are described by Dr. L. C. Glenn, 185 species are recorded, of which 32 are new. Most of the beautiful drawings represent the work of the late Dr. J. C. McConnell.
C. W. J.



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No. 12

LIST OF SHELLS FROM NORTHWESTERN FLORIDA.

BY BRYANT WALKER.

In the fall of 1902, Messrs. G. F. & B. H. King of Mimsville, Ga., to whom we are indebted for the discovery of several new species of *Unionida* recently described in the Nautilus, took a wagon trip of more than one hundred miles from their home into western Florida. No land shells were collected. The list of fluviatile species, however, though not large, is of considerable interest, especially as there are practically no records from that part of the state. Entering Florida at Neal's Landing, the Chipola River was struck at Marianna. From there the route continued southwesterly to Econfinia on Econfine Creek. No *Unionida* were found in the Econfine, but in a tributary called Moccasin Creek, several species occurred. The Chipola River is a branch of the Flint River. Econfine Creek flows directly into St. Andrew's Bay.

Ampullaria depressa Say, Chipola River.

Vivapara georgiana Lea, " "

Campeloma genicula Con., " " and Mud Creek, a tributary of the Econfine.

Lioplax pilsbryi, n. sp. Pl. ix. figs. 1, 2 and 3.

Chipola River (type locality), Econfine Creek, and Mud Creek, Fla.

Shell elevated, turreted, imperforate, rather thin, olive-green above, becoming almost black on the body whorl with numerous dark

strigations: whorls seven, ventricose, moderately increasing above, rapidly so toward the base, those of the spire carinated with a sloping shoulder, lower whorls sub-carinate, flattened above and strongly shouldered; lines of growth strong, decussated by numerous, closely set, elevated, transverse lines; suture very deep; aperture rather large, very oblique, regularly oval, sides nearly parallel, regularly rounded above and below; outer lip thin, drawn back above and somewhat sinuous; inner lip closely appressed throughout.

Alt. (Fig. 1 apex eroded) 30, width 18 mm.

“ “ 2 “ 28 “ 20 “

This fine species, the largest yet known of the genus, was found in some abundance in the Chipola River. Only a few occurred at the other localities.

It differs from all the described forms in its size and peculiar combination of characters. Young specimens of about five whorls, except in being imperforate, slightly wider and more strongly transversely striate, closely resemble striate specimens of *L. subcarinata* in shape, the shouldering and carination of the whorls being almost exactly the same. But with increase of growth the shape becomes entirely different and the mature shell in general appearance approaches Lea's *L. elliotti*, but differs from that species in being very much larger, proportionately wider, with the lower whorl more flatly shouldered, with transverse raised lines and imperforate axis.

I take great pleasure in naming it after Dr. Pilsbry.

Goniobasis catenaria Say. Chipola River and Econfine Creek.

“ *dooleyensis* Lea. “ “ “

This species is apparently one of the characteristic forms of the Flint river drainage system. Originally described from Vienna in Dooley County, Ga., the Messrs. King have found it in great abundance in Rawle's Spring and Dry Creek, Early County, and in the Chickasawahatchee Creek, Baker County. From Mr. A. C. Billups, I have also received it from the Flint River. On the present trip it was found in both the Chipola and Econfine.

UNIONIDÆ FROM THE CHIPOLA RIVER.

Medionidus kingii B. H. Wr.

Lampsilis paulus Lea.

“ *subangulatus* Lea.

Lampsilis claibornensis Lea.

“ *lienosus* Con. Not typical; referable to Lea's *caliginosus*.

“ *lienosus unicastatus* H. B. Wr.

“ *vibex* Con. (approaching var. *nigrinus* Lea.)

Anodonta gibbosa Say,

Unio singularis B. H. Wr.

“ *arctatus tortivus* Lea. Very abundant and extremely variable.

“ *coruscus* Gld.

“ *nigellus* Lea var.? Very close to some forms of the variable *arctatus tortivus* Lea.

“ *curvatus* Lea, a single young shell is thus named by Mr. W. A. Marsh Sr. It is quite similar to young specimens of the Moccasin Creek form referred to *obnubilis (nolani)* by Mr. Marsh, but differs in being rather more elongated, more pointed and less broadly rounded posteriorly.

Unio chipolaensis, n. sp. Pl. ix. figs. 6 and 7.

Shell ovate, not very thick, somewhat inflated in the umbonal region, evenly rounded before and biangulate behind with a slight emargination just above the superior posterior angle; dorsal margin decidedly curved, basal margin slightly but regularly curved, epidermis smooth, chestnut-colored, darkening to black on the umbos, with several darker lines indicating arrested periods of growth. Umbonal slope well rounded towards the beaks, but flattening out and becoming slightly biangulate posteriorly. Beaks prominent, apparently incurved when perfect. Cardinal teeth compressed, crenulate; those in the left valve are nearly in a straight line. Lateral teeth rather long, slender and slightly curved. Cicatrices distinct. Cavity of the beaks large and rounded. Nacre salmon-color, darker anteriorly.

Length 32, width 56.5, diam. 22 mm.

Chipola River, Fla.

This species is a member of group of *U. buckleyi* and is distinguished by smooth, chestnut epidermis, entirely without rays, but ornamented with concentric dark bands such as occur in *Pleurobema chattanoogaensis*, inflated umbonal slope, prominent beaks and biangulated posterior extremity with a slight emargination above. It is related to some forms of *U. burtchianus* B. H. Wr, but differs in

being less elongated and more inflated with more prominent beaks. The color both of the epidermis and nacre is also quite different.

Messrs. Frierson and Marsh, to whom specimens have been submitted, agree that it is distinct from any described form, and Mr. Simpson remarks that it "looks more or less like two or three species, but I cannot refer it to anything." Mr. B. H. Wright suggests that it is close to some forms of *U. confertus* Lea, but both in shape and color, which is remarkably constant in all the specimens seen, it seems sufficiently distinct.

UNIONIDAE FROM MOCCASIN CREEK, A TRIBUTARY OF THE
ECONFINE RIVER.

Lampsilis anodontooides floridensis Lea.

" *lienosus* Con. (*caliginosus* Lea).

" *vibex* Con. (*rutilans* Lea).

Unio downiei Lea, var.

" *arctatus tortivus* Lea.

A very large, heavy, inflated form similar to Lea's *tetricus*, longer but not so swollen as that figured by Simpson in Proc. U. S. Nat. Mus. xv. Pl. lxiv. figs. 3 and 4. Associated with this form is another more compressed, strongly rayed and with umbonal slope, decidedly biangulate, which Mr. Simpson thinks is also referable here. Mr. Marsh considers this identical with Wright's *nolani*, a synonym of the following species.

Unio obnubilis Lea. Two specimens smaller, thicker and apparently quite distinct from the last-mentioned form are referred to *santeensis* Lea, by Marsh, to which Simpson somewhat doubtfully assents.

A NEW SPECIES OF MEDIONIDUS.

BY BRYANT WALKER.

Medionidus simpsonianus n. sp. Pl. ix. figs. 4 and 5.

Shell small, rather thin, somewhat inflated, elliptical, inequilateral, strongly plicate on the posterior slope. Epidermis dark yellow, smooth, polished, covered with dark green pencilled rays which tend to break into a net-work of angular lines covering the entire surface. Anterior end compressed, rounded, and slightly elevated above the

line of the hinge superiorly; posterior extremity obtusely rounded, the tip being nearly on the median line of the shell; posterior ridge somewhat angled; dorsal slope covered with strong sub-concentric, somewhat irregular ridges extending from the posterior ridge to the margin; basal margin regularly curved; hinge margin nearly straight, slightly angled between the cardinal and lateral teeth. Cardinal teeth crenulate, erect, rather compressed, those in left valve nearly on the same line; lateral teeth slender, straight and nearly smooth. Anterior cicatrices well impressed, posterior cicatrices distinct, dorsal cicatrices under the plate behind the cardinal teeth. Beak cavity rather shallow, cavity of the shell deep and uniform. Nacre bluish-white, rather thicker anteriorly.

Length 36; height 19, width 13 mm.

Habitat, Calvary, Ga.

Only three specimens of this little species were received, and these, unfortunately, without any information as to the stream where they were found.

This species belongs to the "*conradicus*" group of *Medionidus* as defined by Simpson, and is most nearly related to *M. penicillatus*. But it differs decidedly from all the described species in the compression of the anterior end, the elevation of the superior-anterior margin and the regularly rounded posterior margin, which is equally curved above and below, the tip being nearly on the median line and not depressed toward the basal margin as in all the allied species. The ridges on the posterior slope are quite as strong, but not so numerous as in *M. kingii*.

It is named in honor of Mr. Charles T. Simpson, whose recent retirement from active conchological work has been a source of regret to all interested in American Conchology.

A NEW LOCALITY FOR CERION INCANUM.

BY CHARLES T. SIMPSON.

I have just returned from a visit to "Baker's Haulover," the narrow strip of land between the extreme upper end of Biscayne Bay, Florida, and the Atlantic. This strip may be twenty rods wide, is low and covered with mangroves on the inner side, and next the ocean is sand-bank twelve or fifteen feet high with shore grapes, low

shrubs, grass and weeds. On the sandy part I found immense numbers of dead shells of *Cerion incanum* and a diligent search revealed a few living examples on grass close to or even on the sand. As the weather for the past few days had been unusually cold, I thought it possible that it might be buried in the sand, and digging around the roots of bunches of grass I unearthed the species alive by thousands. In some cases a double handful would be buried around a small bunch of grass. Many of the specimens had a thin, almost transparent epiphragm at the aperture, while occasionally it was deeper seated, thicker and white.

The apex is rather conical, the apical whorls are corneous, while the last whorl has strong irregular wide-spaced riblets and a dark base, often outlined by a revolving bluish stripe. The body of the shell is a uniform bluish-white, and occasionally a specimen has the base of nearly the same color. In a somewhat wide experience of collecting this species, I have never seen it so abundant. Associated with it were a few *Polygyra carpenteriana* and rarely a *Glandina truncata minor*.

In the Manual of Conchology, Vol. xiv. p. 215, Pilsbry states that Mr. S. N. Rhoads found five specimens of the *Cerion incanum* on Virginia Key, but that he thought they had probably been drifted there, and Pilsbry believes this key to be the extreme northeastern limit of the species. "Baker's Haulover" is eight or nine miles north of the extreme northern end of Virginia Key and is on the mainland. I followed up the beach from the "Haulover" for a half mile perhaps, but there seemed to be no diminution in the numbers of specimens at the farthest point reached.

Lemon City, Florida.

Jan. 29, '05.

SEXUAL DIMORPHISM IN STROMBUS PUGILIS LINNE.

BY HAROLD SELLERS COLTON.

Sexual dimorphism does not seem to be common among the Gasteropoda. It can occur only in the sub-class Streptoneura, in which the sexes are separate. Cases are seldom reported. When they are, they are hidden amid a mass of facts in some large work. I find that sexual dimorphism has been noticed in *Margarita helicina*¹ and

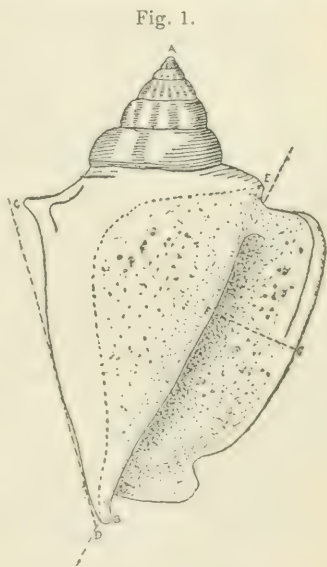
¹ Dwight Blaney, Proc. Boston Society of Nat. Hist., Vol. XXXII., No. 2, p. 38, 1904.

*Buccinum undatum*¹ by Morse, in *Crepidula*² by Conklin, in *Rissoa aculeus*³ and *Littorina littorea*⁴ by Jeffreys, and in *Fulgur carica* by Burnett Smith.⁵ As far as I can find out, no one has reported it in *Strombus pugilis*.

The material was collected to determine if the variety *alatus* was but a case of sexual dimorphism, and if not was there any such difference. I collected most of the individuals after a severe "norther" in the latter part of January which had cast them up in moderate numbers on the beach of Sand Key near Clearwater Harbor, Florida. Of those I examined, nineteen were males and nine were females.

The variety *alatus* differs from the type in that it lacks the characteristic tubercles on the body whorl. Forty-four per cent of the females and twenty-six per cent of the males showed a tendency to be smooth. Of these observations and the ones to follow, the probable error is so very large, on account of the small number of individuals at hand, that only where the differences are pronounced, are the results of value.

On the material at hand I made the following measurements;-(Fig. 1) the length AB, the width CE, the angle at the apex, the columellar angle, and the aperture FG. On account of the ornamentation of the shell, the width CE and the apical angle were found to be so variable as not to be favorable for comparison. The ratio of AB to FG was in the case of females larger than in the case of the males. If this be true, and I have too few individuals to be sure of it absolutely, a very interesting feature is shown. The



¹ E. S. Morse, 1876, Proc. Boston Society of Nat. Hist., Vol. XVIII.

² E. G. Conklin, Jour. of Morphology, 1897, Vol. XIII., No. 1.

³ Jeffreys, British Conchology, Vol. IV., p. 38.

⁴ *Ibid.*, Vol. III., p. 343.

⁵ Burnett Smith, 1902, Proc. Acad. Natural Science of Phila., Vol. LIV., p. 507.

aperture of the male is larger than that of the female. This is true also in *Nautilus pompilius*.¹

The average columella angle CDE is for males 37.4° and for females 40.4° . The columella angle of the females is larger than that of the males. This is characteristic, and it is possible to separate the males from the females in a large series at a glance with very few errors. One male, however, showed the female angle and one female the male angle.

The results of these observations indicate that the relation of the variety *alatus* to the type is not of sexual character, that the aperture of the male may be a trifle wider than that of the female, but the columella angle is a true case of sexual dimorphism.

A NEW SPECIES OF SOMATOGYRUS FROM SOUTH ALABAMA.

BY T. H. ALDRICH.

SOMATOGYRUS WALKERIANUS n. sp.

Shell small, globose, rather solid, smooth, color greenish-yellow. Spire short, obtuse. The nucleus is obliquely placed, and projects markedly beyond the outline of the spire on the left side. Whorls about four, suture impressed. Body whorl large, slightly shouldered; outer lip slightly expanded. Inner lip thickened and rounding below into a rather narrow and deep groove, which runs up into the slightly perforate umbilicus. Aperture rather pointed above and rounded at the base. Alt. 4.25; diam. 4 mm.



LOCALITY.—Conecut River, Escambia Co., Ala., twenty miles east of Brewton, living on limestone rocks, rather common.

REMARKS.—This shell resembles a small *S. subglobosus* Say, but is not so strongly shouldered, has a much lower spire, and also the groove behind the pillar lip. Examples in cabinets of A. A. Hinkley and Bryant Walker. Type in my collection.

¹ Bather, 1895, Natural Science, Vol. VI., p. 411.

NEW SPECIES OF LYMNÆA.

BY F. C. BAKER.

Lymnæa owascoensis nov. sp.

Shell small, elongated, turreted, rather thin; color light horn; surface shining, marked by close-set lines of growth; in some specimens there is a tendency to form raised, keel-like ridges, as in malleated forms of *Lymnæa*; apex small, round, of the same color as the rest of the shell; whorls $5\frac{1}{2}$, shouldered, rather flat-sided; spire elongated, sharply conical; sutures deeply impressed; aperture roundly ovate, about two-thirds the length of the entire shell; outer lip thin, inner lip erect, causing the aperture to be almost continuous; columella rather broad, flattened, somewhat thickened by a callus but without a plait; umbilicus round, wide and deep, exhibiting one volution; the base of the shell is roundly flattened.

Length 8.50; width 3.50; aperture length 3.50; width 2.00 mill.

Length 8.75; width 4.00; aperture length 3.50; width 2.00 mill.

Habitat: Owasco Lake, N. Y., collected by Dr. Howard N. Lyon.

This distinct little shell may be known by its turreted shell, long spire and large, open umbilicus. Its nearest ally is *desidiosa*.

Lymnæa bryanti nov. sp.

Shell small, thin, robust, pointed; color light horn; surface rather dull, marked by rather indistinct lines of growth, but without impressed spiral lines; the base of the shell is marked by several indistinct spiral ridges, and the last whorl is malleated in some specimens; whorls $4\frac{1}{2}$ -5, rounded, roundly shouldered, rapidly increasing in diameter; the last whorl is large and quite convex; spire acutely conical, shorter than or as long as the aperture; sutures well impressed; aperture elliptical or elongate-ovate; columella a trifle thickened, without a plait, the callus turned back and appressed to the parietal wall as in *cubensis*; umbilicus distinct and rather widely open.

Length 7.50; width 4.00; aperture length 4.00; width 2.25 mill.

Length 6.50; width 4.00; aperture length 4.00; width 2.00 mill.

Length 6.50; width 4.00; aperture length 3.50; width 2.00 mill.

Habitat, Alameda Co., California. Collection of Mr. Bryant Walker.

This little shell is related to *cubensis* but is easily distinguished by its thinner shell, more pointed spire, less rounded whorls and more elongate aperture. The shape of the aperture and the form of the columella are different from those of *humilis*.

Lymnaea stagnalis var. *higleyi*, new variety.

Shell ovate with short spire and wide, spreading aperture which is twice the length of the spire; whorls rather flat-sided, the last somewhat shouldered; collumellar plait very large, thick, heavy, shining, white; aperture widely flaring, the upper part somewhat shouldered; umbilicus tightly closed by the closely appressed, reflected, columellar callus.

Length 50.00; width 30.00; aperture length 32.00; width 22.00 mill. (Ferriss).

Length 42.00; width 27.00; aperture length 27.00; width 19.00 mill. (Academy).

Length 38.00; width 22.00; aperture length 25.00; width 17.00 mill. (Walker).

Habitat; Michipicoten Bay, North Shore, Lake Superior.

In a lot of specimens of *Lymnaea stagnalis* sent to the writer for examination by Mr. J. H. Ferriss, there were three specimens which differed markedly from any described American form of this species. The nearest variety seems to be Hemphill's *occidentalis*, but that form is decidedly more shouldered on the body whorl, the aperture does not flare and the spire is more "pinched." The color is a clear translucent whitish horn. The writer has seen no European variety exactly comparable with this variety.

It is named in honor of Prof. William K. Higley, Secretary of the Chicago Academy of Sciences.

GLOCHIDIA OF UNIO ON FISHES.

BY CHAS. H. CONNER.

A short time ago (Feb. 25, 1905), while hunting especially for fresh-water shrimps, I obtained some young minnows and sun-fish (*Eupomotis gibbosus*). Upon examination of the latter, I found several *Glochidia*, apparently of *Anodonta cataraeta* Say, clinging to the anal and caudal fins.

On Monday, Feb. 27th, I had the honor of submitting the specimens, *in situ* and intact, to Dr. Pilsbry and Mr. Vanatta, of the Academy of Natural Sciences, for verification, and they confirmed the discovery.

As no record of observed parasitism in America of *Glochidia* has been made in any scientific journal that I am aware of, it was a great pleasure to find them living, and confirm the observations made in Europe.

The fish were taken from the most eastern of the three connected ponds at Westville, N. J.

NOTES.

MARRATT AND THE CONCHOLOGIA ICONICA.—In the February NAUTILUS, p. 120, in the extract from "The Museums Journal," concerning the late F. P. Marratt, it is stated that he was the author of the monograph on *Oliva* in Reeve's "Conchologia Iconica." This is an error which might be corrected if you think it necessary.

When Lovell Reeve wrote that monograph in 1850, Marratt was unknown as a conchologist.

Of the "Conchologia Iconica" Reeve was author of Vols. I.-XIV., and as far as *Tornatella* in Vol. XV. The rest of that volume, commencing with *Pyramidella* to the end, and Vols. XVI.-XX. were the work of the late G. B. Sowerby.—EDGAR A. SMITH, British Museum (Natural History).

NOTE ON THE GENUS APOREMA DALL.—This group, of which *Pholadonya arata* Verrill is the type was named in 1903. But I am informed that *Aporema* was used in 1890, by Scudder, for an insect, and the molluscan genus therefore requires a new name. I propose for it *Panacca*.—WM. H. DALL.

NOTE ON TRICHODINA ANCEY.—Inasmuch as the name *Trichodina*, proposed by Ancey in 1888 for an Achatinoid land shell (cf. Man. Conch. pt. 67, p. 182) was used in 1830 by Ehrenberg for a genus of Foraminifera, I would propose that it be replaced by *Petriola*.—WM. H. DALL.

THE GENUS VAUCHERIA PALLARY.—Mr. Pallary describes (Journ. de Conch. '04, p. 7.) a shell supposed to be that of a slug, under the name *Vaucheria tingitana*. M. Dautzenberg has recently received fresh specimens, which proved to be plates (the tergum) of *Pollicipes cornucopia*, a stalked barnacle of European seas. The supposed new genus therefore becomes a synonym of the Cirrhipede.

SNAILS IN SEPULCHRES.—While I was very recently conducting the exhuming of quite a number of Indian skeletons, within the corporate limits of Des Moines, Iowa, I found, very much to my surprise, several living specimens of *Zonitoides minusculus* (Binn.) and *Helicodiscus lineatus* (Say,) very snugly associating with the long dead and buried aborigines. They attracted my attention by being among some of the small white beads, which were about the same size and color. I would often pick up a shell for a bead. They were mingled with decayed fibrous roots, fragments of blankets etc., in among the bones, often in the crevices of broken and decayed bones. Everything was in a very advanced stage of decay, denoting in the neighborhood of seventy-five years' burial; the evidence showed that the bodies had been wrapped in blankets and buried in wooden boxes. In a number of instances the entire outfit, box and all, was reduced to a mere trace less than half an inch in thickness; others were two or three inches thick, and a few produced fairly well-preserved skeletons. All contained shells of the above-named species. The burials lay from eighteen inches to three and a half feet deep, in a very loose, fine, sandy, Pleistocene loam. If the snails were at home, as they apparently were, is not their association with dead mens' bones an unusual occurrence?—T. VAN HYNING, Supt. Mus. State Hist. Dept. Des Moines, Ia.

In the last number of the Proceedings of the Malacological Society of London, Dr. von Ihering adds three new species to the genus *Tomigerus*, the first for many years.

A new species of *Achatina*, *A. morrelli*, is described by Mr. Preston, from the Zambesi river. It seems to be closely related to *A. capelloi*. Furtado—H. A. P.

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